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Ken Peters
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Waterford 3

W3F1-2003-0079

September 29, 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Emergency Plan Implementing Procedure
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

In accordance with Appendix E of 10CFR50 and 10CFR50.4(b)(5), Entergy is submitting a revised Waterford 3 Emergency Plan Implementing Procedure. This revised procedure was reviewed in accordance with 10CFR50.54(q) requirements and was determined not to decrease the effectiveness of the Emergency Plan.

The following procedure is included in this submittal:

1. EP-002-050 (Revision 16), Offsite Dose Assessment (Manual). This change includes formatting and editorial changes.

This letter does not contain any commitments. Should you have any questions concerning this procedure, please contact J.J. Lewis, Emergency Planning Manager, at (504) 739-6624.

Sincerely,

K. J. Peters
Director, Nuclear Safety Assurance

KJP/GCS/ssf

Attachment(s): EP-002-050, Revision 16

A045

(w/Enclosures)

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Attachment 1

W3F1-2003-0079

EP-002-050, Revision 16
Offsite Dose Assessment (Manual)

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE			Required Review Level (check one): ☐ OSRC ☒ QUALIFIED REVIEW
PROCEDURE NUMBER: EP-002-050	REVISION: 16	CHANGE: 0	DEVIATION: N/A

TITLE: Offsite Dose Assessment (Manual)

PROCEDURE OWNER (Position Title): Emergency Planning Manager

ACTIVITY (check one):
☐ Change ☒ Revision ☐ Deviation ☐ Deletion ☐ New Procedure ☐ Temporary Procedure

DESCRIPTION AND JUSTIFICATION:
Formatted procedure and editorial changes in accordance with W2.109 and W2.110.
Attachment 7.1 added to the note on Page 9 on "What If" calculations.
Attachment 7.1 added substep 2.6.1 instructions regarding the selection of No Release.
Attachment 7.2, deleted reference to CE-003-517, procedure no longer references monitor locations.
Attachment 7.2 added the correct UNID number to several monitors located on Page 27.
Attachment 7.3, replaced LRPD with LDEQ.
Attachment 7.7, reworded the note on Page 110, page 115 and 116 corrected typo for the conversion factors according to the Health Physics calculations. The Dose Code conversion factors concerning the typos are more conservative.
Attachment 7.8, incorporated the correct Radiation Monitor Grid ID numbers and for the Condenser Vac. Pump WRGM, deleted the words "Diverts discharge to plant stack". This WRGM no longer diverts to the plant stack.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (check one):
☒ Normal ☐ Editorial Correction (May only be used with Changes, Revisions, and Deviations)

REVIEW AND APPROVAL ACTIONS			PRINT NAME OR SIGNATURE	DATE
PREPARER			Marc Van Der Horst	2/17/03
EC SUPERVISOR	Administrative Review and Approval		(sign) N/A	
CROSS-DISCIPLINE REVIEWS (List Groups)	Radiation Protection		Samir Ramzy	8/10/03
			N/A	
			N/A	
			N/A	
			N/A	
50.59 REVIEWER	☒ Programmatically Excluded: OSRC Mtg. No.: 03-003		N/A	
50.54 REVIEWER	Review ☒		Ricky Dube	4/21/03
TECHNICAL REVIEWER	Review		Carl Ramzy	8/10/03
QUALIFIED REVIEWER	Review ☒		A.S. Lubinski	8/11/03
GROUP/DEPT. HEAD	Review ☐	Approval ☒	(sign)	8-14-03
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	
Effective Date / Milestone (if applicable):			~~N/A~~ 09/18/2003	
Expiration Date / Milestone (if applicable):			N/A	

CONTROLLED

W2.109, Rev. 5

COPY No. FEY

TABLE OF CONTENTS

LIST OF EFFECTIVE PAGES

1-8,17-64	Revision 16
65-74, 109-116	Revision 14
9-16	Revision 15
89-108	Revision 13
117-119	Revision 12
75-88	Revision 11

INFORMATIONAL USE

1.0 PURPOSE

1.1 To provide methods for determining projected offsite doses following a major accidental release of radioactive material, for the purpose of recommending offsite protective actions, and for long-term continuous updating of the offsite doses.

1.2 The Onshift organization uses this procedure in the initial stages of an emergency.

1.3 If the dose assessment computer program is unavailable, then the On-site and Near-site organizations use this procedure.

2.0 REFERENCES

2.1 EP-002-051, Offsite Dose Assessment (Computerized)

2.2 EP-001-001, Recognition and Classification of Emergency Conditions

2.3 EP-002-052, Protective Action Guidelines

2.4 EP-002-060, Radiological Field Monitoring

2.5 Emergency Management Resources Book

2.6 Waterford 3 FSAR

2.7 ASME Pressure Vessel Code

3.0 RESPONSIBILITIES

3.1 The Control Room Supervisor is responsible for this procedure during the initial stages of an emergency (or until dose assessment is transferred to the TSC or EOF).

3.2 The Health Physics Coordinator or the Dose Assessment Coordinator is responsible for this procedure if the computerized dose assessment is not available and until dose assessment is transferred to the EOF.

3.3 The Radiological Assessment Coordinator or Field Team Controller is responsible for this procedure when dose assessment is transferred to the EOF and the computerized program is not available.

4.0 INITIATING CONDITIONS

4.1 Declaration of Alert <u>or</u> higher emergency classification,

<u>AND</u>

4.2 An actual or potential release of radioactive material to the environment exists,

<u>OR</u>

4.3 At the discretion of the Emergency Coordinator, Health Physics Coordinator, Dose Assessment Coordinator, EOF Director, Radiological Coordinator <u>or</u> Field Team Controller.

5.0 PROCEDURE

NOTE

This procedure is arranged in attachments.

1. Attachment 7.1 is a conservative method and should only be used by On Shift personnel in the initial stages of an event to estimate offsite doses.

2. When using the procedure to calculate releases from the main steam safety valves, then assume the release occurs for the entire time in which flow is recorded in the main steam line (unless direct observation of the valve indicates otherwise).

3. If the release duration is not known, then 2 hours should always be used as the default release duration.

4. Integrated dose should be considered for protective action decisions.

5. The methodology outlined in this procedure only yields projected dose results.

6. To consider integrated dose, the TSC Dose Assessment Coordinator or EOF Field Team Controller should determine the appropriate response (simple addition of dose results at various times etc.).

5.1 Nomogram Procedure (Attachment 7.1)

5.1.1 This attachment instructs On Shift personnel on the use of the Nomogram in rapidly assessing the consequences of a radiological release in the initial stages of an event.

5.1.2 Nomogram calculations may be performed using the Personal Computer (PC) in the Control Room or by using any of the Nomogram drawings in the Control Room.

5.1.3 A copy of the computerized Nomogram is on the Control Room PC Hard Drive. A copy of the nomogram drawing is provided at the NPO's console desk and at the STA's desk.

> **NOTE**
>
> Each attachment describes a specific method of assessing offsite doses. Attachments 7.2 through 7.6 are to be used when projections can not be performed using dose assessment computer program methods.

5.2 Dose Projections Based on Plant Monitoring Data (Attachment 7.2)

5.2.1 This attachment is used to rapidly assess the maximum offsite doses to determine if offsite Protective Action Guides are to be exceeded and if recommendations for protective actions should be made.

5.2.2 It is the fastest means of manually calculating projections and should be followed up by further detailed calculations (Attachments 7.3 and 7.4), especially those that may be based on actual field data.

5.3 Dose Projections Based on Field Monitoring Data (Attachment 7.3)

5.3.1 This attachment provides methods of performing dose projections based on actual measurements by offsite monitoring teams.

NOTE

Consideration should be given for "release point" isotopic sampling and analysis as soon as practical, when a sample point is available (Plant Stack, FHB, MCES). This is the best method (other than field monitoring) for determining the actual source term.

5.4 Dose Projections Based on Known Isotopic Release Data (Attachment 7.4)

5.4.1 When isotopic analysis of the release path exists, then this attachment provides methods of calculating offsite doses.

5.5 Dose Projections Based on FSAR Accident Data (Attachment 7.5)

5.5.1 This attachment provides methods of calculating offsite doses based on seven types of accidents analyzed in the FSAR.

5.5.2 Dose projections utilizing this technique should be used only if there is insufficient information to utilize the procedures identified in Attachments 7.2, 7.3 or 7.4.

5.5.3 If plant or field data is not available, then use Attachment 7.5.

5.6 Meteorological Data and Calculation of Atmospheric Dispersion Factors (Attachment 7.6)

5.6.1 This attachment provides the method for obtaining meteorological data needed to perform dose projections, the method for using isopleth overlays, and the method for determining atmospheric dispersion factors.

5.6.2 A weather forecast should be obtained for the next 12 hours in accordance with methods in Attachment 7.6.

5.7 Release Rate Estimates Based Upon Survey Meter Data (Attachment 7.7)

5.7.1 This attachment provides a method of using portable radiation survey meter data to project noble gas release rates for use in situations when the installed radiation monitors are inoperable.

5.7.2 If plant or field data is not available, then use Attachment 7.7.

5.8 Gaseous Effluent Radiation Monitors Listing (Attachment 7.8)

5.8.1 This attachment is provided as a reference and lists the gaseous effluent monitors by monitor number, grid identification, channel detector readout units and location.

6.0 FINAL CONDITIONS

6.1 Releases of radioactive material to the atmosphere have been terminated or decreased below the Emergency Action Level (EAL) for an Alert category

OR

6.2 Releases are controlled and a long-term monitoring program has been established.

7.0 ATTACHMENTS

7.1 Nomogram Procedure

7.2 Dose Projections Based on Plant Monitoring Data

7.3 Dose Projections Based on Field Monitoring Data

7.4 Dose Projections Based on Known Isotopic Release Data

7.5 Dose Projections Based on FSAR Accident Data

7.6 Meteorological Data and Calculation of Atmospheric Dispersion Factors

7.7 Release Rate Estimates Based Upon Survey Meter Data

7.8 Gaseous Effluent Radiation Monitors Listing

8.0 RECORDS

None

NOMOGRAM PROCEDURE

1.0 Purpose

NOTE

This attachment should only be used initially by On Shift personnel. Other methods of calculation should be used as soon as possible.

When performing "WHAT IF" calculations (No Release) and printing out a NMF, then ensure the NMF is not used for offsite notifications.

1.1 This attachment provides instructions on the use of the Nomogram by the On Shift personnel to quickly estimate offsite consequences of a release.

1.2 Nomogram calculations can be made by using the Personal Computer in the Control Room or by use of the Nomogram drawings (current revision 08/29/96, Revision 7) available in the Control Room.

2.0 Personal Computer (PC) Procedure

2.1 Double Click on the CRDAP (Control Room Dose Assessment Program) Icon.

2.2 Respond to the display prompts. Press ENTER or "C" to continue with the program, or press "Q" to quit the program.

2.3 If CRDAP fails on the Hard Drive:

2.3.1 Remove the Backup CRDAP disk #1 from the Emergency Communicator's Form Pack Book and insert the disk into appropriate drive slot.

2.3.2 Select the A: drive.

2.3.3 Select MS Dos Control and press ENTER.

2.3.4 The Title Screen should be displayed. Press ENTER or "C" to continue with the program, or press "Q" to quit the program.

2.4 The Caution Screen should be displayed. Press ENTER or "C" to continue with the program, or press "Q" to quit the program.

NOTE

Each Data Entry Block is designed to accept a specific number of characters as indicated by the highlighted section of the screen. If you fill the highlighted area, then the program automatically advances to the next Data Entry Block. If you do not fill the highlighted area, then you need to press ENTER to advance to the next Data Entry Block. For example, if the Data Entry Block is 4 spaces wide and you enter 2.1 (3 spaces), then you have to press ENTER to go to the next block.

2.5 The first Data Entry Screen should be displayed. Most of the Data Entry Blocks can be filled in using the prompts on the screen. If needed, then a detailed description of each block is provided in a. through f. below.

a. In the AUTHOR block enter your name or initials and press ENTER.

b. The DATE block should display the correct date. If the date is wrong, then enter the correct date. Otherwise, just press ENTER.

c. The TIME block should display the correct time. If the time is wrong, then enter the correct time. Otherwise, just press ENTER.

d. Obtain meteorological data from the Plant Monitoring Computer, "GD METDATA". When available, then use use 15-minute averaged meteorological data.

- If not available, then use instantaneous values or refer to Attachment 7.6 for alternative methods of obtaining methods of obtaining meteorological data.

e. In the WIND SPEED block, enter the wind speed in meters per second. Use lower level - 33 Ft. - wind speed.

f. In the WIND DIR. block, enter the direction the wind is coming from. Use lower level - 33 Ft. - wind direction.

g. In the DIFFERENTIAL TEMP. block, enter the delta T.The next data entry screen asks you to identify if there is a RELEASE. Select the appropriate answer by using the left or right arrow keys to highlight your selection, press ENTER, or press the first letter of the option.

2.6.1 If NO RELEASE selected, then GO TO STEP 2.8.

2.7 Select the appropriate RELEASE POINT by highlighting it and press ENTER.

2.8 After entering the Monitor reading, a Check Screen appears. Review the data.

At the foot of the screen seven options appear. These options may be selected by using the left or right arrow keys to highlight your selection, press ENTER, or press the first letter of the option.

NOMOGRAM PROCEDURE

1. DISPLAY – Tab to"DISPLAY" and press ENTER.

   Display provides:

   Release Rates

   Dose Rates at the EAB, 2, 5 & 10 Mile radii

   TEDE Dose at the EAB, 2, 5 & 10 Mile radii

   CDE Thyroid Dose at the EAB, 2, 5 & 10 Mile radii

   Meteorological information

   Emergency Status

2. OUTPUT Tab to "OUTPUT" and press ENTER.

   Output is the signal to print information to the printer.

   Output provides you with a "Hard Copy" of the information.

3. QUIT – Tab to "QUIT" and press ENTER.

   Quit takes you completely out of "CRDAP".

4. REVISE – Tab to "REVISE" and press ENTER.

   Revise takes you back to the first entry screen to allow you to Revise any entry that you have made. Revise allows you to correct an entry error or to modify the data set without requiring reentry of all the data.

5. START OVER – Tab to "START OVER" and press ENTER.

   Start Over takes you back to the first entry screen and requires you to fill in all the blanks again.

6. PAR – Tab to"PAR" and press ENTER.

   PAR provides the Protective Action Recommendations (PARs) associated with the data provided to the CRDAP.

   Press any key to return to the DISPLAY screen.

7. NMF PRINT – Tab to "NMFPRINT" and press ENTER. NMF PRINT provides a Notification Message Form with applicable information in the appropriate blanks.

3.0 Nomogram Drawing Procedure

NOTE

1. Nomogram equipment (grease pen, straightedge) is provided in the drawer labeled for emergency equipment at the NPO's console desk.

2. This nomogram can be used for monitors that read out in uCi/cc or mR/hr (main steam line monitors) by using the proper scale.

3. Ensure that the scales are being read correctly. A different number line may have a different scale. Arrows are provided on the appropriate number lines to indicate the direction of increasing values.

3.1 Using a ruler or other straightedge, Connect Line A (release flow rate) and Line B (monitor reading) and mark the intersection with Line C (noble gas release rate in curies per second). Flow rates are listed behind the "System Flow Rates" tab of this procedure.

NOMOGRAM PROCEDURE

NOTE

Nomogram calculations can be performed using wind speed in meters per second or miles per hour. Ensure the proper number line value is used for the appropriate scale and unit. Wind speed from the meteorological towers is provided in meters per second. Multiply meters per second by 2.24 to get miles per hour.

3.2 Obtain meteorological data from the Plant Monitoring Computer, "GD METDATA". When available, use 15-minute averaged meteorological data.

3.2.1 If 15-minute averaged data is not available, then use instantaneous values, or refer to Attachment 7.6, for alternative methods of obtaining meteorological data.

3.2.2 Determine temperature difference at 60m (199 ft.) - 10m (33 ft.) and wind speed at 10m (33 ft.) from the meteorological towers or backup means as described in Attachment 7.6.

3.3 Connect Line 1 and Line 2 and mark the intersection with Line 3 (dispersion X/Q).

3.4 Connect the points marked on Line 3 and Line C and mark the intersection with Line 4D to obtain the TEDE Dose Rate at the EAB in mRem/hr.

3.4.1 Calculate the TEDE dose rates at 2, 5 and 10 miles by performing the multiplication operations shown near the bottom of the nomogram.

3.4.2 Calculate the 2 hour committed TEDE doses at EAB, 2, 5 and 10 miles by multiplying the TEDE dose rate by 2.

3.5 Calculate the CDE Thyroid dose rates at EAB, 2, 5 and 10 miles by performing the multiplication operation shown near the bottom of the nomogram.

3.5.1 Calculate the 2 hour committed CDE Thyroid dose at EAB, 2, 5 and 10 miles by multiplying the CDE Thyroid dose rate by 2.

3.6.8 <u>If</u> the EAB TEDE dose is 1000 mRem or greater, <u>or</u> the EAB CDE Thyroid dose is 5000 mRem <u>or</u> greater, <u>then</u> use EP-002-052.

DOSE PROJECTIONS BASED ON PLANT MONITORING DATA

1.0 PURPOSE

1.1 This attachment provides the methods for quickly calculating projected offsite doses using plant monitoring system data in order to determine the need for protective actions.

1.2 This attachment also provides a method of estimating the activity in containment available for release based on the containment high range accident monitor readings. This attachment describes the method for estimating potential offsite consequences (doses) based on the information obtained from the high range accident monitors.

2.0 PROCEDURE

NOTE

1. Radiation monitor readings and other information useful in performing offsite dose calculations can be found on ERF Menu mimic display "MARMOND2".

NOTE

It is possible that two release paths and two forms are applicable. If this occurs, then the projected doses and release rates from each form should be added together.

2.1 For calculations using the containment high range accident monitors, then GO TO STEP 2.14.

2.2 Determination of accident type and selection of appropriate forms.

2.2.1 Select the form for the most appropriate accident type and extent of fuel failure based on information communicated by the Emergency Coordinator, EOF Director, Operations Coordinator, Operations/Engineering Coordinator, Health Physics Coordinator , Radiological Assessment Coordinator, and Technical Assessment/Engineering personnel.

2.2.2 To determine if Cladding Barrier Failure exists, evaluate the following:

2.2.2.1 Chemistry results indicate > 300 uCi/gm Dose Equivalent I-131?

2.2.2.2 Has the level in the upper plenum, as measured by the RVLMS, been equal to 0%?

2.2.2.3 Have the CET (Core Exit Thermocouple) temperatures exceeded 700° F?

2.2.2.4 Do Containment dose rates indicate "Initial Clad Failure" (See EP-002-090)?

2.2.2.5 Dose Rates One Foot from Primary Sample indicates ≥ 950 mr/hr (When letdown is lined up and in the recirculation mode of the primary sample).

2.2.2.6 Area Radiation Monitor (ARM-IRE-5020) indicates ≥ 125 mr/hr ((When letdown is lined up and in the recirculation mode of the primary sample).

2.2.2.7 If the answer to any of the above questions is YES, it is assumed that Cladding Barrier Failure has occurred.

2.3 Record the date and time on the selected forms.

NOTE
The exposure duration (for all except main steam line break) should be assumed as two hours unless plant information provides an accurate, dependable prediction of release duration.

2.3.1 Log the exposure duration in Column 5 of the selected form.

2.4 Obtain the following meteorological data from the "MARMOND1" ERF Menu mimic display:

2.4.1 Record the 10-meter (33 foot) wind speed in mph in Column 3 of the selected form. Multiply meters/sec times 2.24 to obtain miles/hour.

2.4.2 Record the wind direction in whole degrees from which the wind is blowing in Section 7 of the selected form.

2.4.3 Record the delta T in degrees centigrade (°C) in section 8 of the selected form.

2.4.4 Based on the delta T, select the proper Xu/Q values from the Xu/Q table and record them in Column 2.

NOTE

If the installed radiation monitor is inoperable, then Attachment 7.7 may be used to determine release rate. If this is the case, then record release rate in column D and GO TO Step 2.8

NOTE

1. Be sure all monitor readings, meteorological data, and flow rates are in units which correspond to those on the worksheet.
2. The priority for selection of monitor readings is:
   a. Select the most representative range. Monitors with mid scale readings should be used if possible.
   b. Effluent PIG Monitor Gas Channel first (if on scale).
   c. WRGM Low, Mid or High channels.
   d. See Attachment 7.8, Gaseous Effluent Radiation Monitors Listing, for ranges.

2.5 Record the proper radiation monitor reading in Column A. Refer to Attachment 7.8, of this procedure for information on gaseous release point radiation monitors.

2.6 Record the flow rate in cfm in Column C.

2.6.1 If the flow rate is unknown, then use the system flow rates given in Table 1 behind the "System Flow Rates" tab of this Attachment.

2.7 Multiply A x B x C and record the product in Column D as noble gas release rate.

2.8 Multiply D x E and record the product in Column F.

2.9 Multiply D x G and record the product in Column H, as iodine release rate.

2.10 Multiply H x I and record the product in Column J.

2.11 Enter the value from Column F in Column 1 in each row designated for TEDE.

2.12 Enter the value from Column J in Column 1 in each row designated for CDE Thyroid.

2.13 Complete the calculations below for each row.

2.13.1 Multiply 1 x 2 and divide by 3. Record the result in Column 4 as the dose rate mRem/hr for TEDE and for CDE Thyroid.

2.13.2 Multiply 4 x 5 and record the product in column 6 as projected dose in mRem.

2.13.2.1 If calculations using the containment high range accident monitors are not performed, then GO TO STEP 2.15.

2.14 For calculation of containment releases based upon high range accident monitor readings, follow the steps below:

CAUTION

In an accident situation with high temperatures (> 250°F) in the containment, the high range radiation monitor may respond erroneously or show a negative response on the lower radiation decades (1 R/hr to 500 R/hr). The higher decades are not affected. If such a situation is present, then calculate containment dose rates in accordance with Attachment 7.7, of this procedure and use this calculated value for the monitor reading.

NOTE

There are 2 containment high range radiation monitors, ARM-IRE-5400 AS and BS. In the event a single channel is inoperable, the second monitor should be used for assessment activities. If both monitors are inoperable, then calculate containment dose rates in accordance with Attachment 7.7 of this procedure and use this calculated value for the monitor reading.

2.14.1 Obtain a monitor reading from the containment high range accident monitors. If both monitors are operable and readings differ, then use the highest reading.

2.14.2 Based on information communicated by the Emergency Coordinator, Operations Coordinator, Health Physics Coordinator and Technical Assessment/Engineering personnel determine whether or not the cladding barrier is considered failed.

2.14.3 Based upon the selected fuel failure condition, record the monitor reading on the Release Rate Worksheet (in this Attachment). Ensure that the data is recorded on the proper line.

2.14.4 Determine the appropriate time conversion factor (TCF) from Table 1 of the worksheet using the time in hours after reactor shutdown.

NOTE
It is important that only the flow rate from containment be used in these calculations. Do not use the total plant stack flow rate, this results in an extremely conservative value.

2.14.5 Determine the projected release rate in CFM for a potential containment release (purge flow rate, design leak rates, etc.). This value should be obtained from Operations or Engineering personnel. Record the flow rate on the Flow Rate line.

2.14.6 Multiply the monitor reading times the noble gas release rate conversion factor (GCF), times the TCF, times the Flow Rate.

2.14.7 The result of these calculations is a Ci/sec noble gas release rate source term for the activity to be released from containment.

2.14.8 Insert the Ci/sec value obtained in 2.14.7 above in column D of the worksheets for LOCA, Cladding Barrier Failure or LOCA.

2.14.9 Complete the calculation of potential offsite doses using the worksheets listed in 2.14.8 above and instructions for their use in this attachment.

2.14.10 If a calculation of the total containment activity concentration is desired, then perform these calculations in accordance with the Containment Activity Worksheet at the end of this section.

2.15 When there is a significant change in the monitor reading (± 20% of instrument decade); then wind speed (next tabulated value in Attachment 7.6, Meteorological Data and Calculation of Atmospheric Dispersion Factors); wind direction ±5° or a change in stability class, the dose projections should be revised on another sheet.

2.16 Record pertinent information, as appropriate, on the Status Boards located in the TSC and EOF.

FUEL HANDLING ACCIDENT

_______________ / _______________ DATE/TIME _________ / _________

PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft³-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE/ NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-3032 (LO)		4.85E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-3032 (MID)		4.85E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-3032 (HI)		4.83E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-5107 A OR B		4.72E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-0100.1S		4.72E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-0100.2S		4.72E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-0110 (LO)		4.85E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-0110 (MID)		4.85E-04			2.27E+04		6.68E-05		1.02E+09	
PRM-IRE-0110 (HI)		4.83E-04			2.27E+04		6.68E-05		1.02E+09	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

FUEL HANDLING ACCIDENT

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM __________°

-8- Δ T _____°C

Xµ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

* **NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

WASTE GAS SYSTEM FAILURE

_______________ / _______________
PRINT LAST NAME SIGNATURE

DATE/TIME _______ / _______

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft^3-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE/ NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		4.83E-04			2.03E+04		6.06E-07		6.46E+08	
PRM-IRE-0110 (MID)		4.86E-04			2.03E+04		6.06E-07		6.46E+08	
PRM-IRE-0110 (HI)		4.83E-04			2.03E+04		6.06E-07		6.46E+08	
PRM-IRE-0100.1S		4.72E-04			2.03E+04		6.06E-07		6.46E+08	
PRM-IRE-0100.2S		4.72E-04			2.03E+04		6.06E-07		6.46E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

WASTE GAS SYSTEM FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

LIQUID WASTE SYSTEM FAILURE

_________________ / _________________
PRINT LAST NAME SIGNATURE

DATE/TIME ________ / ________

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft³-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		4.76E-04			3.03E+04		2.00E-04		1.25E+09	
PRM-IRE-0110 (MID)		4.90E-04			3.03E+04		2.00E-04		1.25E+09	
PRM-IRE-0110 (HI)		4.89E-04			3.03E+04		2.00E-04		1.25E+09	
PRM-IRE-0100.1S		4.71E-04			3.03E+04		2.00E-04		1.25E+09	
PRM-IRE-0100.2S		4.71E-04			3.03E+04		2.00E-04		1.25E+09	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

LIQUID WASTE SYSTEM FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T _____°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

LOCA, CLADDING BARRIER FAILURE, CONTAINMENT SPRAY AVAILABLE

______________/______________ DATE/TIME ________/________
PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft^3-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE. (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		3.64E-04			9.68E+05		3.89E-02		2.96E+08	
PRM-IRE-0110 (MID)		3.43E-04			9.68E+05		3.89E-02		2.96E+08	
PRM-IRE-0110 (HI)		3.40E-04			9.68E+05		3.89E-02		2.96E+08	
PRM-IRE-0100.1S		4.45E-04			9.68E+05		3.89E-02		2.96E+08	
PRM-IRE-0100.2S		4.45E-04			9.68E+05		3.89E-02		2.96E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

LOCA, CLADDING BARRIER FAILURE, CONTAINMENT SPRAY AVAILABLE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem 1 x 2 hr 3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

LOCA, CLADDING BARRIER FAILURE, CONTAINMENT SPRAY NOT AVAILABLE

_______________ / _______________
PRINT LAST NAME   SIGNATURE

DATE/TIME _________ / _________

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft³-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		3.64E-04			6.85E+06		3.89E-01		2.96E+08	
PRM-IRE-0110 (MID)		3.43E-04			6.85E+06		3.89E-01		2.96E+08	
PRM-IRE-0110 (HI)		3.40E-04			6.85E+06		3.89E-01		2.96E+08	
PRM-IRE-0100.1S		4.45E-04			6.85E+06		3.89E-01		2.96E+08	
PRM-IRE-0100.2S		4.45E-04			6.85E+06		3.89E-01		2.96E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

LOCA, CLADDING BARRIER FAILURE, CONTAINMENT SPRAY NOT AVAILABLE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xu/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM __________°

-8- Δ T _____°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

LOCA

_______________ / _______________
PRINT LAST NAME SIGNATURE

DATE/TIME _______ / _______

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft^3-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- + IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		4.72E-04			4.37E+04		1.04E-04		4.98E+08	
PRM-IRE-0110 (MID)		4.72E-04			4.37E+04		1.04E-04		4.98E+08	
PRM-IRE-0110 (HI)		4.72E-04			4.37E+04		1.04E-04		4.98E+08	
PRM-IRE-0100.1S		4.72E-04			4.37E+04		1.04E-04		4.98E+08	
PRM-IRE-0100.2S		4.72E-04			4.37E+04		1.04E-04		4.98E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

\+ NOTE: IODINE NOBLE GAS RATIO IS BASED ON CONTAINMENT SPRAY AVAILABILITY. <u>IF</u> THERE IS NO CONTAINMENT SPRAY AVAILABLE, <u>THEN</u> USE AN IODINE NOBLE GAS RATIO OF 1.04E-03.

LOCA

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ / Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2 / 3)	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ____________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
$\Delta T \le -0.95$	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
$-0.95 < \Delta T \le -0.85$	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
$-0.85 < \Delta T \le -0.75$	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
$-0.75 < \Delta T \le -0.25$	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
$-0.25 < \Delta T \le +0.75$	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
$+0.75 < \Delta T \le +2.00$	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
$+2.00 < \Delta T$	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

S.G. TUBE RUPTURE, CLADDING BARRIER FAILURE

_______________/_______________
PRINT LAST NAME   SIGNATURE

DATE/TIME _________/_________

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft^3-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		3.64E-04			3.14E+05		7.78E-06		2.96E+08	
PRM-IRE-0110 (MID)		3.43E-04			3.14E+05		7.78E-06		2.96E+08	
PRM-IRE-0110 (HI)		3.38E-04			3.14E+05		7.78E-06		2.96E+08	
PRM-IRE-0100.1S		4.44E-04			3.14E+05		7.78E-06		2.96E+08	
PRM-IRE-0100.2S		4.44E-04			3.14E+05		7.78E-06		2.96E+08	
PRM-IRE-0002 (LO)		3.64E-04			3.15E+05		7.78E-05		2.96E+08	
PRM-IRE-0002 (MID)		3.43E-04			3.15E+05		7.78E-05		2.96E+08	
PRM-IRE-0002 (HI)		3.38E-04			3.15E+05		7.78E-05		2.96E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

NOTE: THIS CALCULATION ASSUMES THAT THE STEAM ACTIVITY IS DUMPED TO THE CONDENSER WITH THE RESULTANT "SCRUBBING" OF IODINES AND A RELEASE OF ACTIVITY VIA CONDENSER OFF-GAS. IF PRM-IRE-0002 (CONDENSER EXHAUST) MONITOR IS USED, THEN THE RELEASE IS NOT FILTERED BY THE PLANT STACK FILTERS. (RELEASE HAS NOT DIVERTED TO THE STACK)

S.G. TUBE RUPTURE, CLADDING BARRIER FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- ΔT ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

S.G. TUBE RUPTURE

_______________/_______________ DATE/TIME _______/_______
PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft³-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		4.72E-04			4.12E+04		4.17E-07		4.97E+08	
PRM-IRE-0110 (MID)		4.72E-04			4.12E+04		4.17E-07		4.97E+08	
PRM-IRE-0110 (HI)		4.72E-04			4.12E+04		4.17E-07		4.97E+08	
PRM-IRE-0100.1S		4.72E-04			4.12E+04		4.17E-07		4.97E+08	
PRM-IRE-0100.2S		4.72E-04			4.12E+04		4.17E-07		4.97E+08	
PRM-IRE-0002 (LO)		4.72E-04			4.13E+04		4.17E-06		4.97E+08	
PRM-IRE-0002 (MID)		4.72E-04			4.13E+04		4.17E-06		4.97E+08	
PRM-IRE-0002 (HI)		4.72E-04			4.13E+04		4.17E-06		4.97E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

NOTE: THIS CALCULATION ASSUMES THAT THE STEAM ACTIVITY IS DUMPED TO THE CONDENSER WITH THE RESULTANT "SCRUBBING" OF IODINES AND A RELEASE OF ACTIVITY VIA CONDENSER OFF-GAS. IF PRM-IRE-0002 (CONDENSER EXHAUST) MONITOR IS USED, THEN THE RELEASE IS NOT FILTERED BY THE PLANT STACK FILTERS. (RELEASE HAS NOT DIVERTED TO THE STACK)

S.G. TUBE RUPTURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

LETDOWN LINE BREAK (OUTSIDE CONTAINMENT)

_______________/_______________ DATE/TIME _________/_________

PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING µCi/cc	-B- CONVERSION FACTOR Ci•cc•min / µCi-ft^3-sec	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-0110 (LO)		4.75E-04			1.72E+05		8.34E-03		2.81E+08	
PRM-IRE-0110 (MID)		4.74E-04			1.72E+05		8.34E-03		2.81E+08	
PRM-IRE-0110 (HI)		4.72E-04			1.72E+05		8.34E-03		2.81E+08	
PRM-IRE-0100.1S		4.72E-04			1.72E+05		8.34E-03		2.81E+08	
PRM-IRE-0100.2S		4.72E-04			1.72E+05		8.34E-03		2.81E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

THIS CALCULATION BASED ON IODINE SPIKE ACTIVITY FROM FSAR, TABLE 15.6-3.

LETDOWN LINE BREAK (OUTSIDE CONTAINMENT)

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

MAIN STEAM RELEASE, STEAM LINE BREAK, CLADDING BARRIER FAILURE

_______________/_______________ DATE/TIME _______/_______
PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		2.42E-06	6.10E+03		5.56E+05		6.10E-03		1.99E+08	
PRM-IRE-5500B		2.42E-06	6.10E+03		5.56E+05		6.10E-03		1.99E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, STEAM LINE BREAK, CLADDING BARRIER FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xu/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

MAIN STEAM RELEASE, RELIEF VALVE, CLADDING BARRIER FAILURE

______________/______________ DATE/TIME ________/________
PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		2.42E-06			5.56E+05		6.10E-03		1.99E+08	
PRM-IRE-5500B		2.42E-06			5.56E+05		6.10E-03		1.99E+08	
NOTE: FOR STEAM RELEASED THROUGH MCES OR STACK, USE S.G. TUBE RUPTURE FORM.										

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, RELIEF VALVE, CLADDING BARRIER FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xµ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

MAIN STEAM RELEASE, ATMOS. DUMP VALVE, CLADDING BARRIER FAILURE

______ / ______ PRINT LAST NAME SIGNATURE

DATE/TIME ______ / ______

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		2.42E-06			5.56E+05		6.10E-03		1.99E+08	
PRM-IRE-5500B		2.42E-06			5.56E+05		6.10E-03		1.99E+08	
NOTE: FOR STEAM RELEASED THROUGH MCES OR STACK, USE S.G. TUBE RUPTURE FORM.										

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, ATMOS. DUMP VALVE, CLADDING BARRIER FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xu / Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- ΔT ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

MAIN STEAM RELEASE, EMERGENCY FEED WATER PUMP TURBINE, CLADDING BARRIER FAILURE

__________ / __________ DATE/TIME ______ / ______

PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft³-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		2.42E-06	2.54E+02		5.56E+05		6.10E-03		1.99E+08	
PRM-IRE-5500B		2.42E-06	2.54E+02		5.56E+05		6.10E-03		1.99E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, EMERGENCY FEED WATER PUMP TURBINE , CLADDING BARRIER FAILURE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

*** NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.**

MAIN STEAM RELEASE, STEAM LINE BREAK

_______________/_______________ DATE/TIME _______/_______
PRINT LAST NAME SIGNATURE

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		6.01E-05	6.10E+03		4.63E+04		2.08E-04		4.97E+08	
PRM-IRE-5500B		6.01E-05	6.10E+03		4.63E+04		2.08E-04		4.97E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, STEAM LINE BREAK

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, RELIEF VALVE

_______________/_______________ PRINT LAST NAME SIGNATURE

DATE/TIME _______/_______

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		6.01E-05			4.63E+04		2.08E-04		4.97E+08	
PRM-IRE-5500B		6.01E-05			4.63E+04		2.08E-04		4.97E+08	
NOTE: FOR STEAM RELEASED THROUGH MCES OR STACK, USE S.G. TUBE RUPTURE FORM.										

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, RELIEF VALVE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, ATMOS. DUMP VALVE

_______________/_______________
PRINT LAST NAME SIGNATURE

DATE/TIME _________/_________

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft^3-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m^3	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m^3	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		6.01E-05			4.63E+04		2.08E-04		4.97E+08	
PRM-IRE-5500B		6.01E-05			4.63E+04		2.08E-04		4.97E+08	
NOTE: FOR STEAM RELEASED THROUGH MCES OR STACK, USE S.G. TUBE RUPTURE FORM.										

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, ATMOS. DUMP VALVE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- Xμ/Q	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE mRem/hr (1 x 2)/3	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
$\Delta T \leq -0.95$	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
$-0.95 < \Delta T \leq -0.85$	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
$-0.85 < \Delta T \leq -0.75$	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
$-0.75 < \Delta T \leq -0.25$	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
$-0.25 < \Delta T \leq +0.75$	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
$+0.75 < \Delta T \leq +2.00$	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
$+2.00 < \Delta T$	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, EMERGENCY FEED WATER PUMP TURBINE

_______________/_______________
PRINT LAST NAME SIGNATURE

DATE/TIME ________/________

MONITOR	-A- * MONITOR READING mR/hr	-B- CONVERSION FACTOR Ci-min-hr / sec-ft³-mR	-C- * FLOW RATE (cfm)	-D- NOBLE GAS RELEASE RATE (A x B x C) Ci/sec	-E- TEDE DOSE FACTOR mRem/hr / Ci/m³	-F- TEDE DOSE RATE FACTOR (D x E)	-G- IODINE NOBLE GAS RATIO	-H- IODINE RELEASE RATE (D x G) Ci/sec	-I- CDE DOSE FACTOR mRem/hr / Ci/m³	-J- CDE DOSE RATE FACTOR (H x I)
PRM-IRE-5500A		6.01E-05	2.54E+02		4.63E+04		2.08E-04		4.97E+08	
PRM-IRE-5500B		6.01E-05	2.54E+02		4.63E+04		2.08E-04		4.97E+08	

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

MAIN STEAM RELEASE, EMERGENCY FEED WATER PUMP TURBINE

LOCATION	-1- DOSE RATE FACTOR TEDE FROM COLUMN F CDE FROM COLUMN J	-2- $\frac{X\mu}{Q}$	-3- * WIND SPEED mph
EAB-TEDE			
EAB-CDE THYROID			
2 MILE-TEDE			
2 MILE-CDE THYROID			
5 MILE-TEDE			
5 MILE-CDE THYROID			
10 MILE-TEDE			
10 MILE-CDE THYROID			

-4- DOSE RATE $\frac{mRem}{hr}$ $\frac{1 \times 2}{3}$	-5- EXPOSURE DURATION - hours -	-6- PROJECTED DOSE - mRem - (4 x 5)
		mRem TEDE (EAB)
		mRem CDE THYROID (EAB)
		mRem TEDE (2mi)
		mRem CDE THYROID (2mi)
		mRem TEDE (5mi)
		mRem CDE THYROID (5mi)
		mRem TEDE (10mi)
		mRem CDE THYROID (10mi)

-7- WIND DIRECTION FROM ___________°

-8- Δ T _____°C

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

* NOTE: BE SURE THE UNITS OF ALL DATA ENTRIES CORRESPOND TO THOSE ON THE WORKSHEET.

RELEASE RATE WORKSHEET
BASED ON CONTAINMENT HIGH RANGE ACCIDENT MONITOR

I. CLADDING BARRIER FAILED

Monitor Reading ARM-IRE-5400 AS or BS		Noble Gas Release Rate Conversion Factor (GCF)		Time Conversion Factor (TCF)*		Flow Rate		Noble Gas Release Rate
________R/hr	X	6.95E-06	X	__________	X	________ft^3/min =		________Ci/sec

II. CLADDING BARRIER NOT FAILED

Monitor Reading ARM-IRE-5400 AS or BS		Noble Gas Release Rate Conversion Factor (GCF)		Time Conversion Factor (TCF)*		Flow Rate		Noble Gas Release Rate
________R/hr	X	8.91E-05	X	__________	X	________ft^3/min =		________Ci/sec

* Note - see Table 1 below

TABLE 1
TIME CONVERSION FACTORS

Time after Reactor Shutdown (hr)	**Cladding Barrier Failed**	**Cladding Barrier Not Failed**
0	1.00E+00	1.00E+00
20 min.	1.06E+00	1.14E+00
1	1.19E+00	1.36E+00
2	1.42E+00	1.69E+00
4	2.05E+00	2.48E+00
6	2.96E+00	3.48E+00
8	4.27E+00	4.74E+00
10	6.05E+00	6.25E+00
12	8.49E+00	7.97E+00
14	1.16E+01	9.93E+00
16	1.56E+01	1.21E+01
18	2.03E+01	1.45E+01
20	2.60E+01	1.70E+01
22	3.24E+01	1.98E+01
24	3.97E+01	2.28E+01

For Time After Shutdown That Is Greater Than 24 Hours, Use The 24 Hour Time Conversion Factor.

CONTAINMENT ACTIVITY WORKSHEET
BASED ON CONTAINMENT HIGH RANGE ACCIDENT MONITOR

MONITOR	MONITOR READING R/hr		DERIVED EXPOSURE CORRECTION FACTOR µCi/cc/R/hr		TIME CONVERSION FACTOR (TCF)*		CONTAINMENT NOBLE GAS CONCENTRATION µCi/cc		CONTAINMENT IODINE TO NOBLE GAS RATIO		IODINE CONCENTRATION µCi/cc
I. <u>CLADDING BARRIER FAILURE</u>											
ARM-IRE-5400 AS		X	1.47E-02	X		=		X	(a)3.89E-02	=	
ARM-IRE-5400 BS		X	1.47E-02	X		=		X	(a)3.89E-02	=	
II. <u>CLADDING BARRIER NOT FAILED</u>											
ARM-IRE-5400 AS		X	1.89E-01	X		=		X	(b)1.04E-03	=	
ARM-IRE-5400 BS		X	1.89E-01	X		=		X	(b)1.04E-03	=	

NOTE Derived Exposure Correction Factor = 1/ECF, Where:

ECF = 6.79E+01 R/hr/uCi/cc for Cladding Barrier Failed
ECF = 5.30E+00 R/hr/uCi/cc for Cladding Barrier NOT Failed

* See Table 1 on Release Rate Worksheet (previous page of this procedure)

(a) When Containment Spray is not available, I:NG Ratio = 3.89E-01
(b) When Containment Spray is not available, I:NG Ratio = 1.04E-02

SYSTEM FLOW RATES
TABLE 1

* 1. The stack flow rate will vary as follows:

Normal RAB - (w/o Purge) = 92,190 cfm

Normal RAB + Containment Purge = 107,355 cfm (with the purge valve gagged at 52 degs.)

If purge valve was not gagged, then stack flow with Normal RAB + Containment Purge = 151,330 cfm.

SIAS - RAB and Shield Building ventilation may vary from 3,000 to 10,000 cfm

Actual flow rates should be obtained from Control Room data.

> **NOTE**
>
> Flow rates are ACFM flow rates taken from drawings G-853-S01 and G-853-S02.

* 2. The FHB ventilation varies from 29,565 to 4,000 cfm Emergency Flow rate.

Actual flow rates should be obtained from Control Room data.

3. Main Steam Releases

> **NOTE**
>
> The formulas listed below consist of certain conservative assumptions. Whenever possible, CFM values to be used should be calculated by Technical Assessment/Engineering personnel.

a. Atmospheric Dump Valves (ADV's) Determine the Steam pressure (psia) from Control Room information (use the maximum pressure of 1150 psia only if pressure cannot be determined any other way).

Determine the value of Vg for the selected pressure using Table 2 of this attachment.

Determine CFM using the following formula and enter in column C of the appropriate worksheet.

CFM = (Vg)(0.241)(steam pressure)(60)(number of valves open)

b. Stuck-open SG Safety (Relief) Valve

Determine the Steam pressure psia from Control Room information (use the maximum pressure of 1150 psia only if pressure cannot be determined any other way).

Determine the value of Vg for the selected pressure using Table 2 of this attachment.

Determine CFM using the following formula and enter in column C of the appropriate worksheet.

CFM = (Vg)(0.325)(steam pressure)(60)(number of valves open)

c. Emergency FW Pump Turbine Release

The Emerg. FW Pump releases 254 cfm.

d. Main Steam Line Break

The Main Steam Line Break does not give a continuing release rate but will empty the SG in less than two minutes (assuming feedwater is stopped). Subsequently, the only releases are the amount of primary to secondary leakage. The Engineering Technical Assessment Group must be consulted for a flow rate for the primary to secondary leakage rate.

For Main Steam Line Break:

1) Record the Main Steam Line Monitor reading prior to the break (conversion factor is not valid after break).

2) Use 6.10E+03 cfm for flow rate.

3) Use 3.33E-02 hours (2 min) for release duration.

4) After initial release (2 min), request Engineering Technical Assessment Group to provide flow rate of release due to primary-to-secondary release and calculate release based on reactor coolant concentration.

4. Condenser Vacuum Pump flow rates:

   There are three Condenser Vacuum Pumps. Each with a maximum design flow rate of 70 cfm. The exhauster fan is 1500 cfm.

   Normal operation is 2 pumps running + exhauster fan = 1,640 cfm .

   With 3 pumps running + exhauster fan = 1,170 cfm.

SYSTEM FLOW RATES CONT'D
TABLE 2
SATURATED STEAM: PRESSURE TABLE

Abs Press. Lb/sq In p	Sat. Vapor vg
20	20.08700
30	13.74360
40	10.49650
50	8.51400
60	7.17360
70	6.20500
80	5.47110
90	4.89530
100	4.43100
110	4.04840
120	3.72750
130	3.45440
140	3.21900
150	3.01390
160	2.83360
170	2.67380
180	2.53120
190	2.40300
200	2.28730
210	2.18217
220	2.08629
230	1.99846
240	1.91769
250	1.84317
260	1.77418
270	1.71013
280	1.65049
290	1.59482
300	1.54274
350	1.32554
400	1.16095
450	1.03179
500	.92762
550	.84177
600	.76975
650	.70843
700	.65556
750	.60949
800	.56896
850	.53302
900	.50091
950	.47205
1000	.44596
1050	.42224
1100	.40058
1150	.38073

DOSE PROJECTIONS BASED ON FIELD MONITORING DATA

1.0 PURPOSE

1.1 This attachment provides the methods for recording and using field monitoring team data for projecting doses at other offsite locations.

1.2 Provide the following information to LDEQ:

1.2.1 The State of Louisiana (LDEQ) requests that Waterford 3 provides a Ci/sec release rate.

1.2.2 EOF Dose Assessment personnel should insure that a Ci/sec release rate is provided to the LDEQ.

1.2.3 When this method of Ci/sec release rate calculations are provided to the LDEQ, then inform LDEQ of the method.

2.0 PROCEDURE

2.1 Field monitoring is performed in accordance with EP-002-060. Data is transmitted by the monitoring team to the Dose Assessment Communicator at the TSC or the Field Team Communicator at the EOF when responsibilities have been transferred.

2.1.1 Record field monitoring data on the data sheet - Dose Rate and Air Sample Data Log (Table 1 of this Attachment).

2.1.2 Calculate the Net Count Rate NET cpm on Table 1, at each location, then:

a. Gross Count Rate cpm - Background Count Rate cpm = Net Count Rate cpm

b. Record NET Count Rate cpm on the data sheet and in Column A on Table 2.

NOTE
The DEI Factor should be based on the time since reactor trip, if applicable.

2.1.3 Determine the Thyroid CDE dose rate by using the Thyroid CDE Dose Rate Worksheet (Table 2 of this Attachment).

2.1.4 Record the Thyroid CDE Dose Rate on:

2.1.4.1 Table 3, Column "B".

2.1.4.2 Table 4, Line (B).

2.1.5 Determine the TEDE dose rate by using the TEDE Dose Rate Worksheet (Table 3 of this Attachment).

2.1.6 Record the TEDE Dose Rate on the Dose Projection Calculation Worksheet (Table 4 of this Attachment), Line (A).

2.2 Determination of TEDE Dose or thyroid CDE Dose at other locations is performed using the Dose Projection Calculation Worksheet (Table 4 of this attachment).

2.2.1 Record the location and sample number for which monitoring data is available.

2.2.2 Complete the information at the top of the worksheet, including wind speed, wind direction, date and time.

2.2.3 Complete Line (A) and (B) of Table 4, as follows:

2.2.3.1 Line (A), Record the TEDE Dose Rate from column "E" of Table 3.

2.2.3.2 Line (B) - Record the Thyroid CDE Dose Rate from column "E" of Table 2.

2.2.4 Record the Xu/Q for that location on Line C. The Xu/Q can be found in Attachment 7.6.

> **NOTE**
> For projections to be valid, the meteorological conditions must be nearly constant during the transit time from release point to monitoring point.

2.2.5 To determine the projected TEDE Dose at any other location:

2.2.5.1 Record the location of interest.

2.2.5.2 Record the Xu/Q for that location in Block D.

2.2.5.3 Determine the dose rate by multiplying the known TEDE Dose Rate (Block A) by the Xu/Q at the location of interest (Block D) and dividing the Xu/Q for the location of the known TEDE Dose Rate (Block C) [Block (A x D) ÷ C]. Record in Block E.

2.2.5.4 Record the anticipated or projected exposure in hours in Block F. (Use two hours unless specific data is available.)

2.2.5.5 Determine the projected TEDE Dose by multiplying the TEDE Dose Rate by the release duration (Block E x F).

2.2.6 To determine the projected Thyroid CDE Dose at any other location:

2.2.6.1 Record the location of interest.

2.2.6.2 Record the Xu/Q for that location in Block H.

2.2.6.3 Determine the dose rate by multiplying the known Thyroid CDE Dose Rate (Block B) by the Xu/Q at the location of interest (Block H) and dividing by the Xu/Q for the location of the known Thyroid CDE Dose Rate (Block C) [Block (B x H) ÷ C]. Record in block I.

2.2.6.4 Record the anticipated or projected exposure in hours in Block J. (Use two hours unless specific data is available.)

2.2.6.5 Determine the projected Thyroid CDE Dose by multiplying the projected Thyroid CDE Dose Rate by the release duration (Block I x J). Record in Block K.

2.2.7 Each worksheet can be utilized to project doses at more than one location based on field monitoring data at only one location. If projections are to be based on field monitoring at other locations, then separate worksheets should be used.

TABLE 1

DOSE RATE AND AIR SAMPLE DATA LOG

DATA SHEET										
SAMPLE			DOSE RATE		AIR SAMPLE DATA					
NUMBER	TIME (24 HR)	LOCATION	CLOSED WINDOW mRem/hr	OPEN WINDOW mRem/hr	SAMPLE DURATION (min)	FLOW RATE (CFM)	SAMPLE VOLUME (ft^3)	GROSS COUNT RATE cpm	BACKGROUND COUNT RATE cpm	NET COUNT RATE cpm

____________________/____________________ DATE/TIME__________________/____________

PRINT LAST NAME / SIGNATURE

THYROID CDE DOSE RATE WORKSHEET

_______________/_______________
PRINT LAST NAME / SIGNATURE

DATE/TIME_______________/_______________

SAMPLE			A	B	C	D	E*
NUMBER	TIME	LOCATION	NET Count Rate cpm (FROM TABLE 1)	SAMPLE VOLUME ft^3 (FROM TABLE 1)	D.E.I. FACTOR (FROM TABLE 5 OR 6)	CONVERSION FACTOR $\frac{mRem - ft^3}{cpm - hr}$	THYROID CDE DOSE RATE mRem/hr (See Note E)
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	
						3.11E-01	

* DIVIDE A BY B & MULTIPLY BY C X D TO GET E: (A/B) X C X D = mRem/hr.

E - Record on Table 3, Column "B" and on Table 4, Line (B)

TABLE 3

TEDE DOSE RATE WORKSHEET

______________/______________ DATE/TIME______________/____________

PRINT LAST NAME / SIGNATURE

SAMPLE			A	B	C	D	E
NUMBER	TIME	LOCATION	CLOSED WINDOW mRem/hr (FROM TABLE 1)	THYROID CDE DOSE RATE mRem/hr (FROM TABLE 2)	TEDE / CDE CORRECTION FACTOR	THYROID TEDE FACTOR (B x C)	TEDE DOSE RATE mRem/hr (A + D) (See Note E)
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		
					4.08E-02		

E - Record on Table 4, Line (A)

TEDE & THYROID CDE DOSE PROJECTIONS BASED ON FIELD MONITORING DATA CALCULATION WORKSHEET

DATA LOCATION AND SAMPLE NUMBER: ______________________ DATE: ________________ TIME: _____________

1. FIELD MONITORING AND METEOROLOGICAL DATA

WIND SPEED:__________ MPH
WIND DIRECTION (FROM):_______
Δ T __________
STABILITY CLASS ___________

(A) TEDE DOSE RATE: ___________ mRem/hr (FROM TABLE 3)
(B) THYROID CDE DOSE RATE: _________ mRem/hr (FROM TABLE 2)
(C) XU/Q: _________________ (SEC X MPH/M^3) (FOR FIELD MONITORING DATA LOCATION; ATT. 7.6)

2. PROJECTED TEDE DOSE

	D*	E	F	G
LOCATION OF INTEREST	XU/Q (SEC X MPH/M^3) FOR LOCATION OF INTEREST	DOSE RATE (A X D) + C	EXPOSURE DURATION HOURS	TEDE mRem E X F
EAB				
2 MILES				
5 MILES				
10 MILES				

3. PROJECTED THYROID CDE DOSE

	H*	I	J	K
LOCATION OF INTEREST	XU/Q (SEC X MPH/M^3) FOR LOCATION OF INTEREST	DOSE RATE (B X H) + C	EXPOSURE DURATION HOURS	THYROID CDE mRem I X J
EAB				
2 MILES				
5 MILES				
10 MILES				

* D AND H ARE XU/Q FOR THE LOCATION OF INTEREST OR CONCERN AND CAN BE DETERMINED FROM ATTACHMENT 7.6. XU/Q VALUES HAVE WIND SPEED ALREADY FACTORED IN.

CALCULATED BY: ____________________________

TABLE 5
DOSE EQUIVALENT IODINE (DEI) CORRECTION FACTOR
CLADDING BARRIER NOT FAILED

Time (hr after Shutdown)	DEI Factor
0	1.23
2	1.21
4	1.20
6	1.19
8	1.18
10	1.16
12	1.15
14	1.14
16	1.14
18	1.13
20	1.12
22	1.11
24	1.11
26	1.10
28	1.09
30	1.09
32	1.09
34	1.08
36	1.07
38	1.07
40	1.07
42	1.06
44	1.06
46	1.05
48	1.05
50	1.05

FOR TIME AFTER SHUTDOWN GREATER THAN 50 HOURS USE THE DEI CORRECTION FACTOR FOR 50 HOURS.

TABLE 6
DOSE EQUIVALENT IODINE (DEI) CORRECTION FACTOR
CLADDING BARRIER FAILED

Time (hr after Shutdown)	DEI Factor
0	1.42
2	1.39
4	1.36
6	1.34
8	1.31
10	1.29
12	1.27
14	1.25
16	1.24
18	1.22
20	1.21
22	1.20
24	1.18
26	1.17
28	1.16
30	1.15
32	1.14
34	1.14
36	1.13
38	1.12
40	1.11
42	1.11
44	1.10
46	1.09
48	1.09
50	1.08

FOR TIME AFTER SHUTDOWN GREATER THAN 50 HOURS USE THE DEI CORRECTION FACTOR FOR 50 HOURS

DOSE PROJECTIONS BASED ON KNOWN ISOTOPIC RELEASE DATA

1.0 PURPOSE

This attachment provides the methods for calculating projected offsite doses when the concentration of the isotopes released is known and the flow rate is determined.

2.0 PROCEDURE

> **NOTE**
>
> Dose Projections Based on Known Isotopic Release Data, is the most accurate method to determine Thyroid CDE Dose and TEDE Dose.
>
> This method takes more time to perform, but provides the most accurate dose projections. The required isotopic analysis can be performed while other methods of Dose Projection are being performed.
>
> The Thyroid CDE should be calculated first.

2.1 Determination of the limiting thyroid dose at any specific offsite location is performed using Worksheet 1 of this attachment.

2.1.1 Complete the information at the top of Worksheet 1, including date, time, wind speed, etc.

2.1.2 Record in Column B the concentration of each iodine isotope being released, based on sample analysis or other means of identifying the radionuclide composition of the release. Ensure that the concentrations are expressed in terms of uCi/cc.

2.1.2.1 The sum, of Column B is used on Worksheet 3, to calculate Ci/sec Iodine Release Rate.

2.1.3 Multiply the concentrations recorded in Column B by the dose factor for that isotope (Column C) and record in Column D.

2.1.4 Sum the results of Column D.

2.1.5 Identify the specific location for which the projection is being made in Column E. Calculations are accurate as long as the radionuclide concentrations remain constant.

2.1.6 Record the sum of Column D in the appropriate block(s) in Column F.

2.1.7 Record the flow rate for the release path in Column G. Ensure that the flow rate is recorded in cubic feet per minute.

2.1.8 Record the Xu/Q, using table below, for the specific location E in Column H.

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

NOTE

If the flow path does not include a filter system or the sample was obtained downstream of the filters, then the release fraction is 1.

Plant Stack and Fuel Handling Building Effluent monitors are located Down Stream of the Filters.

2.1.9 Record the fraction of radioiodines being released through the charcoal filters in Column I. Filtration systems generally have a release fraction of 0.1 for Iodines.

2.1.10 Multiply the sum of Column D, the flow rate, the Xu/Q and the release fraction (Column F x G x H x I) and divide by the wind speed (Column J) to determine the projected thyroid dose per hour exposed in terms of mRem/hr exposed. Record the result in Column K. This result is the projected dose rate at the specific location identified and should be used to evaluate the need for protective action(s) and compare with field measurements.

2.1.11 If the release duration is known or can be projected, then enter the duration in hours in Column L. (Use 2 hours if release duration is unknown.)

2.1.12 Determine the projected dose by multiplying the dose per hour exposed by the release duration (Column K x L). Record the projected Thyroid CDE dose in Column M.

2.2 Determination of the TEDE Dose at any specific offsite location is performed using Worksheet 2 of this attachment.

2.2.1 Complete the information at the top of Worksheet 2, including the date, time, wind speed, etc.

2.2.2 Record in Column B the concentration of each isotope being released based on sample analysis or other means of identifying the radionuclide composition of the release. Ensure that the concentrations are expressed in terms of uCi/cc. Page 2 of 2, Worksheet 2, "Other Isotopes", provides Isotope names and Dose Factors for "Other Isotopes" to be used as required on page 1 of 2.

NOTE

If the flow path does not include a filter system or the sample was obtained downstream of the filters, then the release fraction is 1.

:

Plant Stack and Fuel Handling Building Effluent monitors are located Down Stream of the Filters.

2.2.3 Record the fraction of radioiodines and particulates (others listed on page 2 of 2 of worksheet 2) being released through the charcoal and/or HEPA filters. Filtration systems generally have a release fraction of 0.1 for Iodines and 0.01 for particulates.

2.2.4 Multiply the concentrations recorded in Column B by the release fraction in Column C and record the results in Column D.

2.2.4.1 The sum of Column D is used on Worksheet 3, to calculate Ci/sec Nobel Gas Release Rate.

2.2.5 Multiply the values recorded in Column D by the dose factor in Column E and record the results in Column F (D x E).

2.2.6 Sum the results of Column F.

2.2.7 Identify the specific location for which the projection is being made in Column G. Calculations are accurate as long as the radionuclide concentrations remain constant.

2.2.8 Record the sum of Block F in the appropriate block(s) in Column H.

2.2.9 Record the flow rate for the release path in Column I. Ensure that flow is recorded in cubic feet per minute (cfm).

2.2.10 Record the Xu/Q for the specific location G, in Column J. Xu/Q is found at the end of Attachment 7.5.

2.2.11 Multiply the sum of Block F, the flow rate and the Xu/Q (Column H x I x J) and divide by the wind speed (Column K) to determine the TEDE Dose Rate at that location in terms of mRem/hr. Record the result in Column L. This result is the projected dose rate at the specific location identified and should be used to evaluate the need for protective action(s) and to compare with field measurements.

2.2.12 If the release duration is known or can be projected, then enter the duration in hours in Column M. (Use 2 hours if release duration is unknown.)

2.2.13 Determine the projected TEDE Dose by multiplying the dose rate at the specific location by the release duration (Column L x M).

2.3 Determination of the Ci/sec Release Rate for Iodine and Noble Gas is performing using Worksheet 3 of this attachment.

2.3.1 Record in Column B the sum of the Iodine concentration and the Noble Gas concentration.

2.3.1.1 The sum of the Iodine concentration is found in Column B of Worksheet 1.

2.3.1.2 The sum of the Noble Gas concentration is found in Column D of Worksheet 2, (Page 1 of 2).

2.3.2 Record the Iodine Release fraction for Iodine in Column C as found in Column I of Worksheet 1.

2.3.3 Record in Column D the flow rate for the release path. Assuming that the release path is common for both the Iodine concentration and the Noble Gas concentration, this value can be taken from Column G, Worksheet 1 or Column I, Worksheet 2, (Page 1 of 2).

2.3.4 To obtain the Ci/sec release rate, multiply the concentration of the isotopes, times the release fraction, times the flow rate, times the conversion factor (B x C x D x E = F).

DOSE PROJECTIONS BASED ON KNOWN ISOTOPIC RELEASE DATA CONT'D

PROJECTED THYROID CDE
WORKSHEET 1

WIND SPEED: ________MPH
WIND DIRECTION FROM: __________ DATE: __________ TIME: ________ (24 HR)

Δ T: ______________________ °C Stability Class: ________________

THYROID CDE

-A-	-B-	-C-	-D-
ISOTOPE	CONCENTRATION (μCi/cc)	DOSE FACTOR	B X C
I-131		6.14E+05	
I-132		3.63E+03	
I-133		1.04E+05	
I-134		6.14E+02	
I-135		1.79E+04	
Sum Column B=		SUM OF Column D =	

-E-	-F-	-G-	-H-	-I-	-J-	-K-	-L-	-M-
LOCATION	SUM OF COLUMN D	FLOW RATE (CFM)	XU/Q (SEC X MPH/M^3)	RELEASE FRACTION	WIND SPEED (MPH)	CDE DOSE RATE mRem/hr FxGxHxI÷J	EXPOSURE DURATION (hr)	CDE DOSE mRem K x L
EAB								
2 MILES								
5 MILES								
10 MILES								

CALCULATED BY: ________________

PROJECTED TEDE DOSE
WORKSHEET 2 (Page 1 of 2)

WIND DIRECTION FROM:__________ DATE:______________ TIME: ___________ (24 HR)

WIND SPEED:______________ MPH Δ T _____________ STABILITY CLASS ___________

-A-	-B-	-C-	-D-	-E-	-F-
ISOTOPE	CONCENTRATION (µCi/cc)	RELEASE FRACTION	CONCENTRATION OF NOBLE GAS B	DOSE FACTOR	B x C x E
Kr-85m		1		4.39E+01	
Kr-85		1		6.14E-01	
Kr-87		1		2.41E+02	
Kr-88		1		6.14E+02	
Kr-89		1		5.66E+02	
Xe-131m		1		2.31E+00	
Xe-133m		1		8.02E+00	
Xe-133		1		9.44E+00	
Xe-135m		1		1.18E+02	
Xe-135		1		6.61E+01	
Xe-137		1		5.19E+01	
Xe-138		1		3.40E+02	
I-131				2.50E+04	
I-132				2.31E+03	
I-133				7.08E+03	
I-134				1.46E+03	
I-135				3.82E+03	
OTHERS*					
	SUM OF COLUMN D=			SUM OF COLUMN F=	

* See page 2 of 2

-G-	-H-	-I-	-J-	-K-	-L-	-M-	-N-
LOCATION	SUM OF BLOCK F	FLOW RATE (CFM)	XU/Q (SEC X MPH/M^3)	WIND SPEED (MPH)	TEDE DOSE RATE mRem/hr H x I x J ÷ K	EXPOSURE DURATION (hr)	DOSE mRem L x M
EAB							
2 MILES							
5 MILES							
10 MILES							

CALCULATED BY: ______________________________

DOSE PROJECTIONS BASED ON KNOWN ISOTOPIC RELEASE DATA CONT'D

PROJECTED TEDE DOSE

WORKSHEET 2 (Page 2 of 2)

OTHER ISOTOPES

(PARTICULATES)

-A- ISOTOPE	-B- CONCENTRATION (µCi/cc)	-RF- RELEASE FRACTION	-C- DOSE FACTOR	-D- B x RF x C
Ba-137m			1.94E+04	
Ba-140			2.50E+03	
Ce-143			2.22E+03	
Ce-144			2.12E+05	
Cs-134			2.97E+04	
Cs-136			8.50E+03	
Cs-137			1.94E+04	
Cs-138			7.55E+02	
La-140			5.19E+03	
Mo-99			2.45E+03	
Nb-95			4.72E+03	
Pr-143			2.22E+03	
Pr-144			2.12E+05	
Rb-88			2.45E+02	
Rb-89			6.61E+02	
Ru-103			6.14E+03	
Ru-106			2.69E+05	
Sb-129			9.44E+02	
Sr-89			2.36E+04	
Sr-90			7.55E+05	
Sr-91			1.13E+03	
Tc-99m			8.02E+01	
Te-129			6.61E+01	
Te-129m			1.37E+04	
Te-131m			4.06E+03	
Te-132			5.66E+03	
Te-134			3.30E+02	
Y-90			4.72E+03	
Y-91			2.78E+04	
Zr-95			1.51E+04	
			SUM OF COLUMN D =	

DOSE PROJECTIONS BASED ON KNOWN ISOTOPIC RELEASE DATA CONT'D

RELEASE RATE (Ci/sec)

WORKSHEET 3

-A-	-B-	-C-	-D-	-E-	-F-
Isotope Group	Concentration	Release Fraction	Flow Rate	Conversion Factor	Ci/sec Release Rate B x C x D x E
Iodines	(a)	(b)	(c)	4.72E-04	
Noble Gas	(d)	1	(c)	4.72E-04	

(a) = Sum of Column B, Worksheet 1
(b) = From Column I, Worksheet 1
(c) = From Column G, Worksheet 1 or Column I, Worksheet 2, (Page 1 of 2)
(d) = Sum of Column D, Worksheet 2, (Page 1 of 2)

DOSE PROJECTIONS BASED ON FSAR ACCIDENT DATA

1.0 PURPOSE

This attachment provides a method for calculating the projected dose at the EAB. It is based upon seven accidents that were analyzed in the FSAR.

> **NOTE**
>
> This technique should be used only when there is no plant or field monitoring data available. It should be used only as a first approximation and quickly replaced as plant or field data becomes available.

2.0 PROCEDURE

2.1 From the accidents identified on Worksheet 1 of this attachment, select the type of accident based on the actual occurrence (Section 3.0 provides background information for this selection and is used for additional data).

2.2 Find the Xu/Q at the Exclusion Area Boundary (EAB) from Table 1, Xu/Q Table, of this attachment, and record in the appropriate space in Column A of the FSAR Accidents Worksheet. Write EAB in the "Location" blank of the worksheet.

2.3 Divide the Xu/Q by the wind speed and multiply by the appropriate dose factor (includes correction factor) for that accident (TEDE and/or CDE Thyroid) using Worksheet 1 of this attachment to obtain the projected dose at the EAB and record.

2.4 Additional worksheets are to be used to calculate doses at other distances using the appropriate dispersion (Xu/Q) factors. Record the distance in the "Location" blank of the worksheet.

FSAR ACCIDENTS - DOSE PROJECTIONS

WORKSHEET 1

Date: ________________ Time: __________ Wind Direction: __________

Δ T:_______________°C Stability Class: _______________

TEDE Dose & CDE Thyroid Dose at _______________________ Location

				TEDE		CDE Thyroid	
ACCIDENT	Xu/Q -A-	Wind Speed (MPH) -B-	X/Q (A ÷ B) -C-	Dose Factor -D-	TEDE Dose mRem C x D	Dose Factor -E-	CDE Thyroid Dose mRem C x E
Fuel Handling Accident				1.59E+05		4.81E+05	
Waste Gas System Leak				4.50E+05		8.64E+04	
Liquid Waste Release				2.13E+03		1.75E+05	
Loss of Coolant Accident				1.61E+10		7.33E+10	
S/G Tube Rupture				3.38E+04		2.47E+03	
Letdown Break				9.41E+05		1.33E+08	
Main Steam Line Break				1.39E+05		2.70E+07	

3.0 FSAR ACCIDENT ASSUMPTIONS

3.1 This attachment provides the basic assumptions and radiological consequences (Design Basis) for the incidents that are not expected to occur but are postulated because their consequences would include the potential for the release of significant amounts of radioactive material. This attachment is to be used when instrumentation used for assessment is off-scale or inoperable.

3.2 Identify the type of incident which has occurred from the seven incidents defined in 3.3 below. If no identification is possible, then use the most restrictive accident which cannot be reasonably excluded. The information given below should be used in ratioing and adjusting assumed FSAR values with any known actual values in the event of an incident at Waterford 3 Steam Electric Station.

3.3 Identification and Radiological Consequence Assumptions

3.3.1 Fuel Handling Accident

A fuel handling accident is the most restrictive accident defined in the FSAR.

3.3.2 Radioactive Waste Gas System Leak or Failure

This incident assumes an unexpected and uncontrolled release to the atmosphere of radioactive xenon and krypton fission gases.

3.3.3 Liquid Waste System Leak

A Liquid Waste System leak or failure results in a release to the atmosphere and a release of all liquids in the Boron Management System (BMS) and Waste Management System (WMS) to the Reactor Auxiliary Building (RAB). Offsite doses occur as a consequence of released noble gases and iodines assumed to volatilize from the spilled liquids.

3.3.4 Loss of Coolant Accident (LOCA)

A LOCA provides a release path to the environment using containment leakage pathways.

3.3.5 Steam Generator Tube Rupture (SGTR)

This accident assumes a loss of offsite power and a double-ended severance of a single Steam Generator tube and allows transport of reactor coolant into the main steam system. Release is through the Steam Generator safety valves and atmospheric dumps.

3.3.6 Primary Sample or Letdown Line Break

For primary sample or letdown line break incidents, a two-inch schedule 160 pipe is analyzed. A rupture outside the containment causes a release to the Reactor Auxiliary Building (RAB).

3.3.7 Main Steam Line Break

This incident is defined with a simultaneous loss of offsite power. Steam is vented directly to the atmosphere.

DOSE PROJECTIONS BASED ON FSAR ACCIDENT DATA CONT'D

TABLE 1

Xμ/Q TABLE

DELTA T°C 60m - 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

METEOROLOGICAL DATA AND CALCULATION OF
ATMOSPHERIC DISPERSION FACTORS

1.0 PURPOSE

This attachment provides two alternative methods of obtaining meteorological data required to perform dose projection calculations. It should be used when data from either the primary or backup meteorological tower is not available on the ERF MENU display "MARMOND1", or from "GD METDATA". The attachment also includes instructions on the use of isopleth overlays as well as the methodology for determining atmospheric dispersion factors.

2.0 PROCEDURE

2.1 The alternative methods for obtaining meteorological data are:

NOTE
If primary tower data is not available, then instruct individual to go to back-up tower.

2.1.1 Dispatch an individual to the primary meteorological tower to record the following data from the data logger. Instruct the individual to obtain the met data by using one of the two methods available, the keypad method or the personal computer (PC) method. The keypad displays only one point at a time, while the PC displays all points. Instruction for using either method is posted in the met tower shack. The point identification numbers (PTID) for the desired points are listed below.

POINT DESCRIPTION	PRIMARY TOWER PTID #	BACKUP TOWER PTID #
Delta T	28, 29	15
Wind Speed	36	19
Wind Direction	30	16

2.1.2 Contact the National Weather Service (NWS). (Refer to the Emergency Management Resources Book for telephone numbers.)

The National Weather Service provides the following information upon request:

NOTE
You may need to remind the forecaster that the stability class calculation (based on the temperature differential between the 10m and 60m elevations) is provided in the NWS Station Duty Manual. If there are any problems in getting the forecast or other requested information, then contact the NWS Office and request the forecaster-in-charge.

A. Weather forecast for next 12 hours, including:

1. Probability of precipitation: ______________________________
____

2. Forecasted high & low temperatures: ______________________________
____

3. Wind direction and speed: ______________________________
____

B. The estimated Pasquill stability class.

Stability Class ("A" through "G")______________________.

C. Wind Speed (surface wind) ________ knots (x 1.15) = ________ mph.

D. Wind Direction (surface wind) ______________________.

E. Wind Speed and Wind Direction (C & D above) provided from ______________ (location of meteorological station).

2.1.3 Determine the appropriate Pasquill stability class from the following table based on data obtained in section 2.1 above.

Class	Delta T (60 m - 10 m) °C
A - Very Unstable	$\Delta T \leq -0.95$
B - Moderately Unstable	$-0.95 < \Delta T \leq -0.85$
C - Slightly Unstable	$-0.85 < \Delta T \leq -0.75$
D - Neutral	$-0.75 < \Delta T \leq -0.25$
E - Slightly Stable	$-0.25 < \Delta T \leq +0.75$
F - Moderately Stable	$+0.75 < \Delta T \leq +2.00$
G - Very Stable	$+2.00 < \Delta T$

Stability Class ____________________

2.2 Isopleth Overlays are provided for each stability class. The isopleths are used to define plume dimensions as well as approximate relative concentrations (Xu/Qs) and dose rates within the plume.

2.2.1 Select the appropriate Emergency Planning Isopleth Overlay based on stability class.

2.2.1.1 Align the center axis of the overlay with the centerpoint (plant) of the Emergency Planning map.

2.2.1.2 Orient the overlay such that the projection occurs in the downwind direction (e.g., wind direction recorded as from 270 degrees West should orient the overlay in a 90 degrees East direction).

2.2.2 Each isopleth line on the overlay defines the points where the relative concentration (Xu/Q) or dose rate has decreased to a specified fraction of the centerline value. The specified fractions for each isopleth line are given on the overlay.

2.2.3 Estimates of plume travel times for various downwind distances and wind speeds are presented in Table 1 (of this attachment).

NOTE

Very stable conditions (F or G stability class) along with low wind speeds and frequently varying wind directions may result in an extremely narrow, meandering plume. Locating this plume with fixed field monitoring points may not be possible. Therefore it may be appropriate to obtain field monitoring data from non-fixed monitoring locations. Once the plume has been located it would be appropriate to use the steps described below to determine a Xu/Q value to use in calculating dose projections.

2.3 In the event the Computerized Dose Assessment Method fails or a Xu/Q value is required for a non-fixed field monitoring location, the following manual method has been developed. The manual method utilizes the Xu/Q Grid Overlay, and the XuQ values given on Table 2 (of this attachment). The Xu/Q values determined can be used for calculating dose projections in procedure Attachments 7.3, 7.4, and 7.5.

2.3.1 Align the center axis of the Xu/Q Grid Overlay with the centerpoint (plant) of the Emergency Planning map. Orient the overlay such that the projection occurs in the downwind direction (e.g., wind direction recorded as from 270 degrees West should orient the overlay in a 90 degree East direction).

2.3.2 Using the Xu/Q Grid Overlay, determine the coordinates (downwind and off-center distances) of the location of interest with respect to the centerline and off-centerline axes. The coordinates are defined by rounding to the lower 0.5 mile increment on each axis.

2.3.3 Using Table 2 (of this attachment) determine the Xu/Q value corresponding to the downwind and off-center distances determined in step 2.3.2 above for the appropriate stability class. Record this value on the worksheet.

2.3.4 Repeat steps 2.3.2 and 2.3.3 for all locations of interest. Realign the isopleth grid according to changes in wind direction as per step 2.3.1.

PLUME TRAVEL TIME (MINUTES)
TABLE 1

		DOWNWIND DISTANCE									
WIND SPEED (MPH)	EAB (914M)	1 MILE	2 MILES	3 MILES	4 MILES	5 MILES	6 MILES	7 MILES	8 MILES	9 MILES	10 MILES
0.5	68.1	120.0	240.0	360.0	480.0	600.0	720.0	840.0	960.0	1080.0	1200.0
1.0	34.0	60.0	120.0	180.0	240.0	300.0	360.0	420.0	480.0	540.0	600.0
2.0	17.0	30.0	50.0	90.0	120.0	150.0	180.0	210.0	240.0	270.0	300.0
3.0	11.3	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0
4.0	8.5	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0
5.0	6.8	12.0	24.0	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0
6.0	5.7	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
7.0	4.9	8.6	17.1	25.7	34.3	42.9	51.4	60.0	68.6	77.1	85.7
8.0	4.3	7.5	15.0	22.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0
9.0	3.8	6.7	13.3	20.0	26.7	33.3	40.0	46.7	53.3	60.0	66.7
10.0	3.4	6.0	12.0	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0
11.0	3.1	5.5	10.9	16.4	21.8	27.3	32.7	38.2	43.6	49.1	54.5
12.0	2.8	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
13.0	2.6	4.6	9.2	13.8	18.5	23.1	27.7	32.3	36.9	41.5	46.2
14.0	2.4	4.3	8.6	12.9	17.1	21.4	25.7	20.0	34.3	38.6	42.9
15.0	2.3	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0
16.0	2.1	3.8	7.5	11.3	15.0	18.8	22.5	26.3	30.0	33.8	37.5
17.0	2.0	3.5	7.1	10.5	14.1	17.5	21.2	24.7	28.2	31.8	35.3
18.0	1.9	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3
19.0	1.8	3.2	6.3	9.5	12.6	15.8	18.9	22.1	25.3	28.4	31.6
20.0	1.7	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0
25.0	1.4	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0
30.0	1.1	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
35.0	1.0	1.7	3.4	5.1	6.9	8.6	10.3	12.0	13.7	15.4	17.1
40.0	0.9	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
50.0	0.7	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0

Xμ/Q TABLE

Δ T ______°C

Xμ/Q TABLE

DELTA T°C 60m – 10m	S.I.	EAB	2 MILES	5 MILES	10 MILES
ΔT ≤ -0.95	A	1.10E-05	1.30E-06	5.80E-07	3.10E-07
-0.95 < ΔT ≤ -0.85	B	5.30E-05	4.50E-06	7.70E-07	4.10E-07
-0.85 < ΔT ≤ -0.75	C	1.20E-04	1.30E-05	2.50E-06	7.00E-07
-0.75 < ΔT ≤ -0.25	D	2.90E-04	4.70E-05	1.20E-05	4.40E-06
-0.25 < ΔT ≤ +0.75	E	5.10E-04	9.70E-05	2.80E-05	1.10E-05
+0.75 < ΔT ≤ +2.00	F	8.50E-04	2.10E-04	6.60E-05	2.80E-05
+2.00 < ΔT	G	1.30E-03	4.40E-04	1.60E-04	6.90E-05

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS A
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	1.5E-05	2.5E-06	1.7E-06	1.3E-06	1.1E-06	9.2E-07	8.0E-07	7.1E-07	6.4E-07	5.8E-07
0.5	1.8E-11	5.0E-08	2.6E-07	4.3E-07	5.1E-07	5.4E-07	5.3E-07	5.1E-07	4.9E-07	4.7E-07
1.0	—	4.0E-13	9.3E-10	1.5E-08	5.5E-08	1.1E-07	1.6E-07	2.0E-07	2.3E-07	2.5E-07
1.5	—	—	7.8E-14	5.7E-11	1.3E-09	7.3E-09	2.1E-08	4.0E-08	6.2E-08	8.5E-08
2.0	—	—	1.5E-19	2.3E-14	7.0E-12	1.7E-10	1.2E-09	4.3E-09	1.0E-08	1.9E-08
2.5	—	—	—	9.8E-19	8.5E-15	1.3E-12	3.1E-11	2.4E-10	1.0E-09	2.8E-09
3.0	—	—	—	—	2.3E-18	3.7E-15	3.5E-13	7.2E-12	5.8E-11	2.7E-10
3.5	—	—	—	—	—	3.4E-18	1.8E-15	1.1E-13	2.0E-12	1.7E-11
4.0	—	—	—	—	—	—	4.0E-18	9.3E-16	4.2E-14	6.7E-13
4.5	—	—	—	—	—	—	—	4.1E-18	5.2E-16	1.8E-14
5.0	—	—	—	—	—	—	—	—	3.9E-18	3.1E-16
5.5	—	—	—	—	—	—	—	—	1.7E-19	3.5E-18
6.0	—	—	—	—	—	—	—	—	—	2.6E-20
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS A CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	5.3E-07	4.9E-07	4.6E-07	4.3E-07	4.0E-07	3.8E-07	3.6E-07	3.4E-07	3.2E-07	3.1E-07
0.5	4.4E-07	4.2E-07	4.0E-07	3.8E-07	3.6E-07	3.5E-07	3.3E-07	3.2E-07	3.0E-07	2.9E-07
1.0	2.6E-07	2.7E-07	2.7E-07	2.7E-07	2.7E-07	2.6E-07	2.6E-07	2.5E-07	2.5E-07	2.4E-07
1.5	1.1E-07	1.2E-07	1.4E-07	1.5E-07	1.6E-07	1.7E-07	1.7E-07	1.7E-07	1.8E-07	1.8E-07
2.0	3.0E-08	4.2E-08	5.4E-08	6.6E-08	7.8E-08	8.8E-08	9.7E-08	1.0E-07	1.1E-07	1.2E-07
2.5	5.9E-09	1.1E-08	1.6E-08	2.3E-08	3.1E-08	3.9E-08	4.6E-08	5.4E-08	6.1E-08	6.7E-08
3.0	8.2E-10	1.9E-09	3.8E-09	6.5E-09	1.0E-08	1.4E-08	1.9E-08	2.4E-08	2.9E-08	3.4E-08
3.5	7.9E-11	2.6E-10	6.8E-10	1.4E-09	2.6E-09	4.3E-09	6.5E-09	9.1E-09	1.2E-08	1.6E-08
4.0	5.4E-12	2.6E-11	9.2E-11	2.5E-10	5.6E-10	1.1E-09	1.9E-09	3.0E-09	4.5E-09	6.2E-09
4.5	2.5E-13	1.9E-12	9.6E-12	3.5E-11	9.8E-11	2.3E-10	4.7E-10	8.6E-10	1.4E-09	2.2E-09
5.0	8.3E-15	1.0E-13	7.7E-13	3.8E-12	1.4E-11	4.1E-11	1.0E-10	2.1E-10	4.0E-10	6.9E-10
5.5	1.9E-16	4.2E-15	4.7E-14	3.3E-13	1.6E-12	6.0E-12	1.8E-11	4.5E-11	9.8E-11	1.9E-10
6.0	3.1E-18	1.2E-16	2.2E-15	2.3E-14	1.5E-13	7.3E-13	2.7E-12	8.2E-12	2.1E-11	4.7E-11
6.5	3.4E-20	2.6E-18	8.0E-17	1.2E-15	1.2E-14	7.5E-14	3.5E-13	1.3E-12	3.9E-12	1.0E-11
7.0	---	4.1E-20	2.2E-18	5.4E-17	7.3E-16	6.3E-15	3.8E-14	1.8E-13	6.4E-13	2.0E-12

NOTE: --- MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS B
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	6.8E-05	1.8E-05	7.9E-06	4.5E-06	2.9E-06	2.0E-06	1.5E-06	1.1E-06	8.9E-07	7.7E-07
0.5	2.2E-15	1.8E-08	2.9E-07	6.2E-07	7.7E-07	7.7E-07	7.1E-07	6.4E-07	5.6E-07	5.3E-07
1.0	—	1.8E-17	1.3E-11	1.7E-09	1.5E-08	4.5E-08	8.3E-08	1.2E-07	1.4E-07	1.7E-07
1.5	—	—	8.2E-19	8.5E-14	2.0E-11	3.9E-10	2.3E-09	6.9E-09	1.5E-08	2.6E-08
2.0	—	—	—	8.4E-20	1.9E-15	5.0E-13	1.5E-11	1.3E-10	6.0E-10	1.8E-09
2.5	—	—	—	—	1.3E-20	9.7E-17	2.3E-14	8.3E-13	9.8E-12	6.1E-11
3.0	—	—	—	—	—	—	8.4E-18	1.7E-15	6.4E-14	9.6E-13
3.5	—	—	—	—	—	—	—	1.1E-18	1.7E-16	7.1E-15
4.0	—	—	—	—	—	—	—	—	1.8E-19	2.5E-17
4.5	—	—	—	—	—	—	—	—	—	4.0E-20
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS B CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	7.1E-07	6.5E-07	6.1E-07	5.7E-07	5.3E-07	5.0E-07	4.8E-07	4.5E-07	4.3E-07	4.1E-07
0.5	5.1E-07	5.0E-07	4.8E-07	4.6E-07	4.4E-07	4.3E-07	4.1E-07	4.0E-07	3.8E-07	3.7E-07
1.0	2.0E-07	2.2E-07	2.4E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	2.7E-07	2.7E-07	2.7E-07
1.5	4.0E-08	5.7E-08	7.3E-08	8.9E-08	1.0E-07	1.2E-07	1.3E-07	1.4E-07	1.5E-07	1.6E-07
2.0	4.4E-09	8.5E-09	1.4E-08	2.1E-08	2.9E-08	3.8E-08	4.7E-08	5.6E-08	6.5E-08	7.3E-08
2.5	2.5E-10	7.3E-10	1.7E-09	3.3E-09	5.7E-09	8.9E-09	1.3E-08	1.7E-08	2.2E-08	2.8E-08
3.0	7.6E-12	3.7E-11	1.3E-10	3.5E-10	7.7E-10	1.5E-09	2.6E-09	4.1E-09	6.1E-09	8.4E-09
3.5	1.2E-13	1.1E-12	6.0E-12	2.4E-11	7.3E-11	1.8E-10	4.0E-10	7.5E-10	1.3E-09	2.1E-09
4.0	1.0E-15	1.8E-14	1.8E-13	1.1E-12	4.8E-12	1.6E-11	4.5E-11	1.1E-10	2.2E-10	4.1E-10
4.5	4.7E-18	1.8E-16	3.3E-15	3.3E-14	2.2E-13	1.0E-12	3.8E-12	1.2E-11	2.9E-11	6.6E-11
5.0	1.1E-20	1.0E-18	3.8E-17	6.7E-16	7.0E-15	4.9E-14	2.5E-13	9.7E-13	3.1E-12	8.4E-12
5.5	—	—	2.7E-19	8.9E-18	1.5E-16	1.6E-15	1.2E-14	6.2E-14	2.6E-13	8.7E-13
6.0	—	—	—	7.9E-29	2.4E-18	4.0E-17	4.2E-16	3.1E-15	1.7E-14	7.3E-14
6.5	—	—	—	—	2.5E-20	7.0E-19	1.1E-17	1.2E-16	8.8E-16	4.9E-15
7.0	—	—	—	—	—	—	2.3E-19	3.5E-18	3.6E-17	2.7E-16

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS C
$(S \bullet MPH/M^3)$
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	1.5E-04	4.5E-05	2.2E-05	1.3E-05	8.7E-06	6.2E-06	4.7E-06	3.7E-06	3.0E-06	2.5E-06
0.5	—	2.8E-10	6.9E-08	4.2E-07	8.8E-07	1.2E-06	1.4E-06	1.4E-01	1.4E-06	1.3E-06
1.0	—	—	2.1E-15	1.5E-11	9.1E-10	8.6E-09	3.2E-08	7.4E-08	1.3E-07	1.8E-07
1.5	—	—	—	5.3E-19	9.8E-15	2.3E-12	6.3E-11	5.5E-10	2.4E-09	6.8E-09
2.0	—	—	—	—	—	2.2E-17	1.0E-14	5.8E-13	9.4E-12	7.0E-11
2.5	—	—	—	—	—	—	1.4E-19	8.6E-17	7.6E-15	1.9E-13
3.0	—	—	—	—	—	—	—	—	1.2E-18	1.4E-16
3.5	—	—	—	—	—	—	—	—	—	2.9E-20
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS C CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	2.1E-06	1.8E-06	1.5E-06	1.3E-06	1.2E-06	1.1E-06	9.5E-07	8.5E-07	7.7E-07	7.0E-07
0.5	1.2E-06	1.1E-06	1.0E-06	9.4E-07	8.7E-07	8.0E-07	7.4E-07	6.8E-07	6.3E-07	5.8E-07
1.0	2.3E-07	2.7E-07	3.0E-07	3.2E-07	3.4E-07	3.4E-07	3.5E-07	3.4E-07	3.4E-07	3.3E-07
1.5	1.5E-08	2.6E-08	3.9E-08	5.4E-08	7.0E-08	8.5E-08	9.9E-08	1.1E-07	1.2E-07	1.3E-07
2.0	3.1E-10	9.5E-10	2.3E-09	4.5E-09	4.5E-10	1.2E-08	1.7E-08	2.3E-08	2.9E-08	3.5E-08
2.5	2.2E-12	1.4E-11	5.8E-11	1.8E-10	1.4E-11	9.6E-10	1.8E-09	3.0E-09	4.6E-09	6.5E-09
3.0	5.0E-15	7.7E-14	6.5E-13	3.6E-12	2.4E-13	4.4E-11	1.1E-10	2.5E-10	4.8E-10	8.3E-10
3.5	3.9E-18	1.7E-16	3.3E-15	3.5E-14	2.1E-15	1.2E-12	4.3E-12	1.3E-11	3.3E-11	7.3E-11
4.0	—	1.4E-19	7.2E-18	1.7E-16	1.0E-17	1.7E-14	1.0E-13	4.3E-13	1.5E-12	4.4E-12
4.5	—	—	—	3.9E-19	2.5E-20	1.5E-16	1.4E-15	9.2E-15	4.6E-14	1.8E-13
5.0	—	—	—	—	—	7.2E-19	1.2E-17	1.3E-16	9.3E-16	5.2E-15
5.5	—	—	—	—	—	—	6.1E-20	1.1E-18	1.2E-17	1.0E-16
6.0	—	—	—	—	—	—	—	—	1.1E-19	1.4E-18
6.5	—	—	—	—	—	—	—	—	—	1.3E-20
7.0	—	—	—	—		—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS D
($S \bullet MPH/M^3$)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES)									
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	3.5E-04	1.3E-04	7.2E-05	4.7E-05	3.4E-05	2.6E-05	2.1E-05	1.7E-05	1.4E-05	1.2E-05
0.5	---	4.2E-15	6.5E-10	4.7E-08	3.3E-07	9.3E-07	1.7E-06	2.3E-06	2.9E-06	3.2E-06
1.0	---	---	---	4.7E-17	3.2E-13	4.4E-11	8.8E-10	6.2E-09	2.4E-08	6.2E-08
1.5	---	---	---	---	---	2.7E-18	3.0E-15	3.2E-13	8.1E-12	8.4E-11
2.0	---	---	---	---	---	---	---	3.2E-19	1.1E-16	8.1E-15
2.5	---	---	---	---	---	---	---	---	---	5.6E-20
3.0	---	---	---	---	---	---	---	---	---	---
3.5	---	---	---	---	---	---	---	---	---	---
4.0	---	---	---	---	---	---	---	---	---	---
4.5	---	---	---	---	---	---	---	---	---	---
5.0	---	---	---	---	---	---	---	---	---	---
5.5	---	---	---	---	---	---	---	---	---	---
6.0	---	---	---	---	---	---	---	---	---	---
6.5	---	---	---	---	---	---	---	---	---	---
7.0	---	---	---	---	---	---	---	---	---	---

NOTE: --- MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS D CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE	DOWNWIND DISTANCE (MILES)									
(MILES)	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	1.1E-05	9.3E-06	8.3E-06	7.4E-06	6.7E-06	6.1E-06	5.6E-06	5.1E-06	4.8E-06	4.4E-06
0.5	3.5E-06	3.6E-06	3.6E-06	3.6E-06	3.6E-06	3.5E-06	3.4E-06	3.3E-06	3.1E-06	3.0E-06
1.0	1.2E-07	2.1E-07	3.1E-07	4.2E-07	5.3E-07	6.4E-07	7.4E-07	8.3E-07	9.1E-07	9.8E-07
1.5	4.8E-10	1.8E-09	5.1E-09	1.1E-08	2.2E-08	3.8E-08	5.9E-08	8.5E-08	1.1E-07	1.5E-07
2.0	2.0E-13	2.3E-12	1.6E-11	7.5E-11	2.6E-10	7.3E-10	1.7E-09	3.5E-09	6.3E-09	1.1E-08
2.5	9.0E-18	4.5E-16	9.9E-15	1.2E-13	8.6E-13	4.5E-12	1.8E-11	5.7E-11	1.5E-10	3.5E-10
3.0	---	1.3E-20	1.2E-18	4.3E-17	8.0E-16	9.0E-15	6.8E-14	3.7E-13	1.6E-12	5.5E-12
3.5	---	---	---	---	2.1E-19	5.8E-18	9.4E-17	9.9E-16	7.3E-15	4.1E-14
4.0	---	---	---	---	---	---	4.7E-20	1.0E-18	1.5E-17	1.4E-16
4.5	---	---	---	---	---	---	---	---	1.3E-20	2.3E-19
5.0	---	---	---	---	---	---	---	---	---	---
5.5	---	---	---	---	---	---	---	---	---	---
6.0	---	---	---	---	---	---	---	---	---	---
6.5	---	---	---	---	---	---	---	---	---	---
7.0	---	---	---	---	---	---	---	---	---	---

NOTE: --- MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS E
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	5.9E-04	2.5E-04	1.4E-04	9.7E-05	7.2E-05	5.6E-05	4.6E-05	3.8E-05	3.2E-05	2.8E-05
0.5	—	—	1.5E-14	1.1E-10	7.8E-09	7.9E-08	3.2E-07	7.6E-07	1.4E-06	2.1E-06
1.0	—	—	—	—	—	2.2E-16	1.0E-13	6.2E-12	1.1E-10	8.2E-10
1.5	—	—	—	—	—	—	—	2.0E-20	1.5E-17	1.8E-15
2.0	—	—	—	—	—	—	—	—	—	—
2.5	—	—	—	—	—	—	—	—	—	—
3.0	—	—	—	—	—	—	—	—	—	—
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES FOR STABILITY CLASS E CONT'D. (S•MPH/M3) TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	2.5E-05	2.2E-05	2.0E-05	1.8E-05	1.6E-05	1.5E-05	1.4E-05	1.3E-05	1.2E-05	1.1E-05
0.5	2.8E-06	3.4E-06	3.9E-06	4.4E-06	4.7E-06	5.0E-06	5.1E-06	5.3E-06	5.3E-06	5.4E-06
1.0	3.8E-09	1.2E-08	3.0E-08	6.1E-08	1.1E-07	1.7E-07	2.5E-07	3.5E-07	4.6E-07	5.7E-07
1.5	6.4E-14	1.0E-12	8.8E-12	5.0E-11	2.0E-10	6.5E-10	1.7E-09	3.8E-09	7.6E-09	1.4E-08
2.0	1.3E-20	2.0E-18	1.0E-16	2.4E-15	3.1E-14	2.6E-13	1.5E-12	6.9E-12	2.5E-11	7.3E-11
2.5	—	—	—	—	3.9E-19	1.1E-17	1.9E-16	2.0E-15	1.5E-14	8.8E-14
3.0	—	—	—	—	—	—	—	9.8E-20	1.9E-18	2.4E-17
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS F
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	9.5E-04	4.7E-04	2.9E-04	2.1E-04	1.6E-04	1.3E-04	1.0E-04	8.8E-05	7.6E-05	6.6E-05
0.5	—	—	—	7.3E-17	7.5E-13	1.3E-10	3.0E-09	2.4E-08	1.0E-07	2.8E-07
1.0	—	—	—	—	—	—	—	5.0E-19	2.3E-16	2.0E-14
1.5	—	—	—	—	—	—	—	—	—	—
2.0	—	—	—	—	—	—	—	—	—	—
2.5	—	—	—	—	—	—	—	—	—	—
3.0	—	—	—	—	—	—	—	—	—	—
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS F CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	5.9E-05	5.3E-05	4.8E-05	4.4E-05	4.0E-05	3.7E-05	3.4E-05	3.2E-05	3.0E-05	2.8E-05
0.5	5.9E-07	1.0E-06	1.6E-06	2.2E-06	2.9E-06	3.6E-06	4.2E-06	4.8E-06	5.4E-06	5.9E-06
1.0	5.7E-13	7.5E-12	5.7E-11	2.9E-10	1.1E-09	3.1E-09	7.7E-09	1.6E-08	3.1E-08	5.4E-08
1.5	—	2.1E-20	2.2E-18	9.5E-17	2.0E-15	2.5E-14	2.1E-13	1.3E-12	5.7E-12	2.1E-11
2.0	—	—	—	—	—	—	8.6E-20	2.2E-18	3.4E-17	3.6E-16
2.5	—	—	—	—	—	—	—	—	—	—
3.0	—	—	—	—	—	—	—	—	—	—
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS G
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.0	1.7E-03	8.5E-04	5.9E-04	4.4E-04	3.5E-04	2.8E-04	2.4E-04	2.0E-04	1.8E-04	1.6E-04
0.5	—	—	—	—	—	9.2E-18	1.5E-14	1.9E-12	5.8E-11	6.8E-10
1.0	—	—	—	—	—	—	—	—	—	—
1.5	—	—	—	—	—	—	—	—	—	—
2.0	—	—	—	—	—	—	—	—	—	—
2.5	—	—	—	—	—	—	—	—	—	—
3.0	—	—	—	—	—	—	—	—	—	—
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

ISOPLETH GRID XU/Q VALUES
FOR STABILITY CLASS G CONT'D.
(S•MPH/M^3)
TABLE 2

OFF-CENTER DISTANCE (MILES)	DOWNWIND DISTANCE (MILES) 5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
0.0	1.4E-04	1.3E-04	1.2E-04	1.1E-04	9.7E-05	9.0E-05	8.4E-05	7.8E-05	7.3E-05	6.9E-05
0.5	4.3E-09	1.8E-08	5.3E-08	1.3E-07	2.6E-07	4.6E-07	7.4E-07	1.1E-06	1.5E-06	2.0E-06
1.0	—	4.7E-20	5.1E-18	2.2E-16	4.7E-15	6.0E-14	5.0E-13	3.0E-12	1.4E-11	5.1E-11
1.5	—	—	—	—	—	—	—	—	5.3E-20	1.1E-18
2.0	—	—	—	—	—	—	—	—	—	—
2.5	—	—	—	—	—	—	—	—	—	—
3.0	—	—	—	—	—	—	—	—	—	—
3.5	—	—	—	—	—	—	—	—	—	—
4.0	—	—	—	—	—	—	—	—	—	—
4.5	—	—	—	—	—	—	—	—	—	—
5.0	—	—	—	—	—	—	—	—	—	—
5.5	—	—	—	—	—	—	—	—	—	—
6.0	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—
7.0	—	—	—	—	—	—	—	—	—	—

NOTE: — MEANS THE XU/Q VALUE IS LESS THAN 1.0E-20

RELEASE RATE ESTIMATES BASED UPON SURVEY METER DATA

1.0 PURPOSE

This attachment provides a method of using portable radiation survey meter data to project noble gas release rates for use in situations when the installed radiation monitors are inoperable. Once obtained, the release rate data can be used with Attachment 7.2. This attachment also provides a method of using survey meter data to estimate dose rates in the Reactor Containment Building for use in situations when the containment high range accident radiation monitors are inoperable. This information can be used with Attachment 7.2 to estimate containment releases.

2.0 PROCEDURE

2.1 Survey Meter Release Rate Worksheets

2.1.1 Have Health Physics personnel obtain survey meter readings on the appropriate release point piping. Readings should be taken at the correct designated distances and locations (see Survey Meter Release Rate Worksheets) depending upon radiological conditions.

2.1.2 Based on information communicated by the Emergency Coordinator and Technical Assessment/Engineering personnel, determine whether or <u>not</u> fuel cladding barrier failure is appropriate to the situation. (See criteria beginning at Step 2.2.2, of Attachment 7.2 of this procedure).

2.1.3 Based upon the selected fuel cladding barrier failure condition, record the dose rate measured by Health Physics on the Survey Meter Release Rate Worksheet. Note that the reading should be recorded in units of mR/hr and ensure that the data is recorded on the appropriate line.

2.1.4 Record the appropriate flow rate in CFM on the Worksheet. See Attachment 7.2, Table 1 (of the "System Flow Rates" TAB of this procedure) to determine CFM to use if a flow rate is <u>not</u> available from the Control Room.

2.1.5 Multiply the survey meter reading times the conversion factor times the flow rate. The product is the noble gas release rate in Ci/sec. Record on the Worksheet.

2.1.6 This release rate is the same as the Column D Noble Gas Release Rate found on the worksheets in Attachment 7.2. The release rate determined via this attachment may then be used with Attachment 7.2 to perform dose projections.

2.2 Survey Meter Containment Shield Building Worksheet, Worksheet No. 5

NOTE

Readings from the Post-LOCA Monitors on the +46 elevation (ARM-IRE-5028S and ARM-IRE-5031S) may be substituted for survey meter readings. However, any existing main steam line activity may cause erroneous readings on the Post - LOCA Monitors.

2.2.1 Surveys may be taken on contact with the exterior of the Containment Shield Building on either the +69' or +46' elevation. (see Survey Meter Containment Shield Building Worksheet, Worksheet No. 5).

2.2.2 Based on information communicated by the Emergency Coordinator and Technical Assessment/Engineering personnel, determine whether or not fuel cladding barrier failure is appropriate to the situation. (See criteria beginning at Step 2.2.2, of Attachment 7.2 of this procedure).

2.2.3 Based upon the selected fuel cladding barrier failure condition, record the dose rate measured by Health Physics on the Survey Meter Containment Shield Building Worksheet, Worksheet No. 5. Ensure that the data is recorded on the proper line.

2.2.4 Multiply the survey meter reading times the conversion factor. The product is the containment dose rate at the location of the containment high range accident radiation monitor.

2.2.5 This dose rate may then be used in accident assessment or dose projection activities as appropriate using Attachment 7.2 of this procedure.

SURVEY METER RELEASE RATE WORKSHEET
WORKSHEET NO. 1

RELEASE POINT: CONDENSER VACUUM PUMP EXHAUST

SURVEY LOCATION: Turbine Building 2nd floor, immediately west of elevator at bend of large white pipe (MCES pipe).

A. Fuel Cladding Barrier Failed

1. At contact with pipe

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.62E-06	x	_______CFM	=	_______Ci/sec

2. At 3' from pipe

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	6.86E-06	x	_______CFM	=	_______Ci/sec

B. Fuel Cladding Barrier <u>Not</u> Failed

1. At contact with pipe

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	2.22E-05	x	_______CFM	=	_______Ci/sec

2. At 3' from pipe

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	9.31E-05	x	_______CFM	=	_______Ci/sec

SURVEY METER RELEASE RATE WORKSHEET

WORKSHEET NO. 2

RELEASE POINT: PLANT STACK

SURVEY LOCATION: +69 foot elevation. Take readings at a height 3' off of floor elevation. For 60' reading - due west of plant stack just to the right of the main steam reliefs.

NOTE
The calculations in A (Fuel Cladding Barrier Failed) or B (Fuel Cladding Barrier Not Failed) are to be used with the appropriate worksheet in Attachment 7.2 for all plant stack releases except those resulting from a LETDOWN LINE BREAK ACCIDENT IN THE RAB. Use the calculations in C (Letdown Line Break Accident) for these releases. Ensure the appropriate Attachment 7.2 worksheet is selected for a LETDOWN LINE BREAK ACCIDENT IN THE RAB (Outside Containment).

A. Fuel Cladding Barrier Failed

1. At contact with stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	4.28E-07	x	_______CFM	=	_______Ci/sec

2. At 3' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	9.94E-07	x	_______CFM	=	_______Ci/sec

3. At 60' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.67E-05	x	_______CFM	=	_______Ci/sec

SURVEY METER RELEASE RATE WORKSHEET

WORKSHEET NO. 2 (CONT'D.)

RELEASE POINT: PLANT STACK (CONT'D.)

B. Fuel Cladding Barrier Not Failed

1. At contact with stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	5.93E-06	x	_______CFM	=	_______Ci/sec

2. At 3' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.37E-05	x	_______CFM	=	_______Ci/sec

3. At 60' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	2.31E-04	x	_______CFM	=	_______Ci/sec

C. Letdown Line Break Accident

1. At contact with stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	5.97E-06	x	_______CFM	=	_______Ci/sec

2. At 3' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.38E-05	x	_______CFM	=	_______Ci/sec

3. At 60' from stack

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	2.33E-04	x	_______CFM	=	_______Ci/sec

SURVEY METER RELEASE RATE WORKSHEET

WORKSHEET NO. 3

RELEASE POINT: Main Steam Line

SURVEY LOCATION: A steam line - +46 west steam line penetration. For 5' reading - at edge of main steam line support (survey between containment wall and steam line support).

B steam line - +46 east steam line penetration. For 5' reading - forward of containment purge inlet at edge of main steam line support (survey between containment wall and steam line support).

A. Fuel Cladding Barrier Failed

1. At contact with steam line

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.34E-06	x	_______CFM	=	_______Ci/sec

2. At 5' from steam line

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.04E-05	x	_______CFM	=	_______Ci/sec

B. Fuel Cladding Barrier Not Failed

1. At contact with steam line

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	2.33E-05	x	_______CFM	=	_______Ci/sec

2. At 5' from steam line

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
_______mR/hr	x	1.81E-04	x	_______CFM	=	_______Ci/sec

SURVEY METER RELEASE RATE WORKSHEET

WORKSHEET NO. 4

RELEASE POINT: FHB Emergency Exhaust

SURVEY LOCATION: A and B emergency exhaust ventilation ducts located on +1 level of FHB in HVAC room behind door number 191; the ducts are located between A and B filtration trains (survey on the bottom of the appropriate duct between exhaust fan and wall).

At contact with duct:

Survey Meter Reading		Conversion Factor		Flow Rate		Release Rate
________mR/hr	x	6.02E-04	x	_______CFM	=	_________Ci/sec

SURVEY METER CONTAINMENT SHIELD BUILDING WORKSHEET
WORKSHEET NO. 5

I. +46' Elevation

SURVEY LOCATION: Contact with wall in Fuel Handling Building at south end of spent fuel transfer canal at refueling canal area radiation monitor.

A. Fuel Cladding Barrier Failed

Survey Meter Reading		Conversion Factor		Containment Dose Rate
________mR/hr	x	1.15E+03	=	_______R/hr

B. Fuel Cladding Barrier Not Failed

Survey Meter Reading		Conversion Factor		Containment Dose Rate
________mR/hr	x	1.53E+03	=	_______R/hr

II. +69' Elevation

SURVEY LOCATION: Contact at any point on the Containment Shield Building at +69 elevation out of line-of-sight of plant stack.

A. Fuel Cladding Barrier Failed

Survey Meter Reading		Conversion Factor		Containment Dose Rate
________mR/hr	x	6.64E+02	=	_______R/hr

B. Fuel Cladding Barrier Not Failed

Survey Meter Reading		Conversion Factor		Containment Dose Rate
________mR/hr	x	8.77E+02	=	_______R/hr

GASEOUS EFFLUENT RADIATION MONITORS LISTING

MONITOR	DESCRIPTION	DETECTOR	GRID ID	UNITS	COMMENT
PRM-IRE-3032	FHB HVAC WRGM	LOW	RE3032-1	uCi/cc	EMERGENCY
		MID	RE3032-2	uCi/cc	EXHAUST
		HIGH	RE3032-3	uCi/cc	
		RELEASE	RE3032-4	uCi/sec	
PRM-IRE-5107A	FHB HVAC PIG	PART	RE5107A-2	uCi/cc	NORMAL
		IOD	RE5107A-3	uCi/cc	EXHAUST
		NG	RE5107A-1	uCi/cc	
PRM-IRE-5107B	FHB HVAC PIG	PART	RE5107B-2	uCi/cc	NORMAL
		IOD	RE5107B-3	uCi/cc	EXHAUST
		NG	RE5107B-1	uCi/cc	
PRM-IRE-0110	PLANT STACK	LOW	RE0110-1	uCi/cc	PLANT STACK
	WRGM	MID	RE0110-2	uCi/cc	EXHAUST
		HIGH	RE0110-3	uCi/cc	
		RELEASE	RE0110-4	uCi/sec	
PRM-IRE-0100.1S	PLANT STACK PIG	PART	RE0100.1-2	uCi/cc	PLANT STACK
		IOD	RE0100.1-3	uCi/cc	EXHAUST
		NG	RE0100.1-1	uCi/cc	
PRM-IRE-0100.2S	PLANT STACK PIG	PART	RE0100.2-2	uCi/cc	PLANT STACK
		IOD	RE0100.2-3	uCi/cc	EXHAUST
		NG	RE0100.2-1	uCi/cc	
PRM-IRE-0002	COND VAC PUMP	LOW	RE0002-1	uCi/cc	TB ROOF VENT
	WRGM	MID	RE0002-2	uCi/cc	EXHAUST
		HIGH	RE0002-3	uCi/cc	
		RELEASE	RE0002-4	uCi/sec	

GASEOUS EFFLUENT RADIATION MONITORS LISTING CONT'D

MONITOR	DESCRIPTION	DETECTOR	GRID ID	UNITS	COMMENT
PRM-IRE-5500A	MAIN STEAM LINE	GM	RE5500A-1	mR/hr	WEST SIDE
PRM-IRE-5500B	MAIN STEAM LINE	GM	RE5500B-1	mR/hr	EAST SIDE
ARM-IRE-5400AS	CONT HIGH RANGE	I0N CHAMBER	RE5400A-1	mR/hr	+99 RCB EAST WALL
ARM-IRE-5400BS	CONT HIGH RANGE	I0N CHAMBER	RE5400B-1	mR/hr	+99 RCB WEST WALL

GASEOUS EFFLUENT RADIATION MONITORS LISTING CONT'D

UNID #	GRID ID#	MONITOR	ACCIDENT TYPE	COMMENTS
PRM-IRE-0002 (Lo) PRM-IRE-0002 (Mid) PRM-IRE-0002 (Hi)	RE0002-1 RE0002-2 RE0002-3	Cond. Vac. Pump WRGM µCi/cc	S.G. Tube Rupture	Primary to secondary leak.
PRM-IRE-0100.1S PRM-IRE-0100.2S	RE0100.1-1 RE0100.2-1	Plant Stack PIG µCi/cc	1)Fuel Handling Accident; 2)Waste Gas System Failure; 3)Liquid Waste System Failure; 4)Letdown Line Break Accident; 5)LOCA: 6)S.G. Tube Rupture	Main exit for the plant. Isolates containment purge.
PRM-IRE-0110 (Lo) PRM-IRE-0110 (Mid) PRM-IRE-0110 (Hi)	RE0110-1 RE0110-2 RE0110-3	Plant Stack WRGM µCi/cc	1)Fuel Handling Accident: 2)Waste Gas System Failure: 3)Liquid Waste System Failure: 4)Letdown Line Break 5)LOCA: 6)S.G. Tube Rupture	Main Release Point During Accident.
PRM-IRE-3032 (Lo) PRM-IRE-3032 (Mid) PRM-IRE-3032 (Hi)	RE3032-1 RE3032-2 RE3032-3	FHB WRGM µCi/cc	Fuel Handling Accident	Monitor on emergency ventilation system.
PRM-IRE-5107A PRM-IRE-5107B	RE5107A RE5107B	FHB Exhaust PIG µCi/cc	Fuel Handling Accident	
ARM-IRE-5400AS ARM-IRE-5400BS	RE5400A-1 RE5400B-1	Cont. Hi Range Accident Monitor R/hr	1)Calculated Total Containment Activity: 2)LOCA	
PRM-IRE-5500A PRM-IRE-5500B	RE5500A-1 RE5500B-1	Main Steam Monitor A & B mR/hr	1)Main Steam Line Break: 2)Main Steam Relief Valve 3)Main Steam Atmos Dump Valve: 4)Main Steam EFWP Turbine	

MONITOR RANGE INFORMATION

Description	Detector Range*	Mid Range
PIG Gas Channel	1.00E-07 to 1.00E-01	1.00E-04
WRGM Low Range	1.00E-07 to 1.00E-01	1.00E-04
WRGM Mid Range	1.00E-04 to 1.00E+02	1.00E-01
WRGM High Range	1.00E-01 to 1.00E+05	1.00E+02

*units are µCi/cc of Xe-133